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UNITED STATES ARMY AVIATION DIGEST

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MARCH 1963 VOLUME 9 NUMBER 3

DIRECTOR OF ARMY AVIATION, ODCSOPS
DEPARTMENT OF THE ARMY
Brig Gen Delk M. Oden

COMMANDANT, U. S. ARMY AVIATION SCHOOL
Brig Gen Robert R. Williams

ASST COMDT, U. S. ARMY AVIATION SCHOOL
Col Warren R. Williams

EDITORIAL STAFF

Capt Richard Anglin
Fred M. Montgomery
Richard K. Tierney
William H. Smith
M/Sgt Thomas M. Lang
Diana G. Williams

USABAAR EDUCATION AND LITERATURE DIV

Pierce L. Wiggin
William E. Carter
James E. Coleman

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Cover: The OV-1 Mohawk is the Army's fastest airplane. It is designed to out-maneuver jet type aircraft.

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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Articles, photos, and items of interest on Army Aviation are invited. *Direct communication is authorized to: Editor-in-Chief, U. S. Army Aviation Digest, Fort Rucker, Alabama.*

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Sir:

I read with interest two articles on flying safety in the November '62 issue, namely "Judgment & Ducks," which is being brought to the attention of all squadron pilots, and "The Cat and Duck Method of Flight."

The latter brings to mind a long forgotten method of instrument approaches used in Alaska and other northern regions known as the Labrador Duck Approach. The "unenlightened" in range ADF and ILS procedures would capture a duck during the summer months and keep the bird caged and in the cockpit until transferred South. When encountering the usual fogs of all seasons in the North (day or night) 00 etc., the duck would come into play.

When on final approach, the duck was placed up in front of the windshield facing forward and watched closely by the pilot and copilot. Upon nearing the ground, the duck would *rare back* and start backlashing his wings. At this time power was reduced and a safe landing assured.

I cannot personally vouch for this method, as my success at capturing a duck has been nil, and it is difficult to get affidavits from those who use this method.

WILLIAM S. ELMORE
Lt Col, Alaska ANG

Sir:

Reference is made to the article appearing in "Crash Sense," September 1962 issue of the ARMY AVIATION DIGEST, "A Matter of Life or Death." I would like to take issue with you on the WHY of this accident. The article says SLIPSHOD MAINTENANCE. My opinion is that this accident was caused by SLIPSHOD *TECHNICAL AND COMMAND* SUPERVISION.

It is stated that the crewchief of this machine had only two months OJT with rotary wing aircraft. If this is the case WHY was this man assigned as crewchief with a 670 MOS? WHY was he allowed to remove controls from the machine without "technical supervision"? WHY hadn't the "maintenance officer and/or line chief" made certain that this man had made the proper entries on the -2?

Knowing that this particular individual had only two months OJT on rotary wing aircraft, WHY wasn't all of his work supervised, to include the entries that were made or should have been made in the -2? It is inconceivable that such a relatively inexperienced individual would be given the immense responsibility of crewing a machine that could carry a human to his death.

There are more WHYs to this saga, and there will continue to be WHYs as long as there is indiscriminate awarding of aviation MOSs to people who are either ill trained or not capable of holding the MOS. Unfortunately there are people in the aviation field who do not belong in it, but are in it for the thrill of flying and the extra money. Until all of our maintenance people are required to attend a formal course of instruction to be awarded a maintenance MOS, there will be indiscriminate awarding of the MOS and there will continue to be WHYs.

No, sir, I believe that SLIPSHOD MAINTENANCE is a direct result of *SLIPSHOD* COMMAND AND TECHNICAL SUPERVISION.

FREDERICK W. PERKINS
MSgt

• *To ensure that the highest possible standard of maintenance is obtained, all 670 mechanics should be school trained instead of OJT trained. Ideally, even a school trained 670 mechanic should never have to crew an aircraft. Furthermore, the Department of Maintenance, USAAVNS, feels that extenuating circumstances must indeed exist before a 670 OJT mechanic, with little or no experi-*

ence, is given the grave responsibility of crewing an aircraft.

Once the 670 mechanic has been appointed as a crewchief, it is imperative that he be given continuous and personal supervision by the line chief. Also, the technical inspector should be extremely critical while inspecting all maintenance performed by this new crewchief. This increased supervision is absolutely essential due to the lack of training and experience on the part of the 670 mechanic.

The Department of Maintenance feels that MSgt Perkins was absolutely correct when he said, "SLIPSHOD MAINTENANCE is a direct result of SLIPSHOD COMMAND AND TECHNICAL SUPERVISION." Only through proper training, effective use of personnel, and command emphasis on proper maintenance techniques and procedures can we preclude such occurrences in the future.

Sir:

In your article "Your Airway Host," June issue, the *first* example presented by Lieutenant Dillon is an understatement; I have rarely had a reception as good as he describes at an Army airfield. He should not pull his punch in such an obvious fashion.

However, this alone is not sufficient justification for writing to you, but a quotation from the Flight Safety Foundation Bulletin ["Meals, Not Snacks," DIGEST, June 1962, page 31] pointing out the folly of skipping dinner then flying is justification. I wish I had a dollar for each meal skipped by transient Army Aviators at Army posts because:

1) "No transportation."
2) "That uniform is not allowed in the mess."
3) "The mess closed ten minutes ago."
4) "The snack bar is not open —inventory, you know."
5) "Sorry, I don't know *where* you can eat at this hour—I eat at home."
6) "Have you tried carrying your lunch with you on a flight?"
7) "Sorry, the Coke machine has been empty for a week."
8) "The coffee machine is broken, too."

These are answers that I have received in response to the question, "Where can I get a bite to eat?"

Almost every flight safety bulletin that I have received during the past year has stressed the danger of flying on an empty stomach—something that I am sure all AAs know about now. However, they are not the ones who can provide the facilities.

There is a crying need for a campaign that will educate *senior Army commanders* on the *proper care* and *feeding* of *Army Aviators.*

Item: At 1130, one of my aviators departed in an O-1 to take a colonel to a forward CP, about 30 minutes' flying time from the post. They landed on a road near the CP, and the colonel told the aviator to wait for him. About one hour later the colonel returned to the plane, rubbing his stomach and expressing satisfaction with the fine dinner that he had eaten at the CP! (The aviator had to wait until 1430 when he was able to eat at a PX.)

Now, I know the colonel well —well enough to know that there is nothing mean or little about his character. If he had been driven to the CP in a jeep, he would have made sure that his driver was fed. The simple truth is that it just did not occur to the colonel that his aviator had a need for food, too!

There is little prospect of beneficent effect in addressing bulletins re the proper care and feeding of Army Aviators to aviators. They should be addressed to (and be required reading by) the senior commanders who have the funds and authority to establish proper and adequate facilities at Army airfields and to ensure that, once established, they are available 24 hours per day.

The very thought of a pilot from one of the other services landing at an Army post gives me a feeling of acute embarrassment.

Hungry Aviator

Sir:

. . . On page 14 of July 62 [issue] is a photo of two unidentified mechanics working on an L-4 on floats. I think the mechanic with his back to the camera could be me. . . . If the photo was taken in the summer of 1946 it is me. . . . I worked for Lt Sullivan. . . . I met Lt Sullivan in 1952 when I went through fixed wing flying school at Fort Sill. He was a major then. . . .

I am a member of the 39th Aviation Co, Louisiana National Guard.

CAPT HENRY E CHENET, JR.
8824 27th St
Metairie, La.

P. S.
I would also like to mention that the thing I enjoyed most that summer of 1946 was the crash boat. At that time I think it was the fastest boat on Lake Lawtonka. One of my jobs was to keep the brass polished.

With the retirement of General Powell, the Active Army lost one of its staunchest advocates of increased air transportation —airmobility—for today's modern Army. Many times, both publicly and officially, he has stressed the importance of airmobility as opposed to strict surface mobility in any tactical movement of troops from the United States to a battle area. Some of his views on this subject are presented below.

General Herbert B. Powell, USA Ret

ARMY AIRMOBILITY

CITING MILITARY operations as recorded by history in all eras, General Powell contends that mobility and firepower were the two most influential military factors bearing on either success or failure. "Whenever one outstripped the other," he says, "the imbalance became very restrictive. The commander who lacked either one could not fully exploit the power of the other."

General Powell believes that the dominating factor of World War I was firepower—in the form of machinegun and artillery fire. Mobility was achieved only near the end of the conflict through the introduction of tanks in small quantities and through "the sheer numerical weight of resources applied by the Allied powers."

Just the opposite was true at the outbreak of World War II. By the end of the war, however, firepower had again overtaken mobility.

Gen Herbert B. Powell, who retired from active duty 31 January after more than 43 years service, is the Army's first and only four-star general to wear the Army rated aviator badge. General Powell's last duty assignment was CG, USCONARC.

Since WW II the Army has again advanced in mobility—primarily through increased emphasis on the aircraft as a prime mover of men and material. During the Korean conflict the helicopter assumed and has retained an important role in the airmobility concept.

As an outspoken proponent of the Army's need for aviation buildup, General Powell believes the once deficient quality of Army airmobility is being overcome. He has proposed that the airmobility program be given its proper place in today's Army and that an effective system be set up with authority to direct the achievement of its goal.

In stressing the importance of expanded airmobility for Army ground forces, General Powell has emphasized the need for increased quantity as well as quality in this direction—quantity of both air materiel (planes as well as supporting logistical materiel) and aviator and aviation maintenance manpower.

To accomplish this, the General believes that the Department of the Army Office of Personnel Operations should include an Aviation Personnel Division. At the same time, he advocates an aviation officer career designed to attract the needed high quality personnel and a far greater use of warrant officers as pilots. [The United States Army Aviation School has started the initial fixed wing qualification course for warrant officer candidates.]

Such an expanded aviation program in the Army would make the Army's ground forces overwhelmingly more effective through greater mobility.

In an address before the Peninsula Chapter, Association of the U. S. Army, at Fort Eustis, Va., on October 19, 1962, General Powell said:

Gen Powell, qualified in both fixed and rotary wing aircraft is shown in an UH-1A as Maj Gen W. F. Train hands him his helmet.

"Today the margin of firepower over mobility is undoubtedly the greatest ever attained. Strategic and tactical nuclear weapons—coupled with long-range delivery systems—lead the list . . . An enemy equipped with atomic weapons and a reliable delivery system poses a tremendous threat to any ground transported force, no matter where. The more these ground-transported units and their equipment are massed, the more likely and lucrative a target they become.

". . . I do emphasize that our own mobility must approximate our firepower. . . . The national power which first succeeds in fully achieving this balance between firepower and mobility will have a great advantage over its adversary."

The General emphasized that what is needed to achieve such a balance is mobility on a *selective basis.* This, he told the group, requires improvement in the mobility of both reconnais-

sance and striking forces.

In qualifying this, General Powell said that while an added supply of aircraft organic to the Army units "will improve their ability to perform general missions, *a new approach is required to develop fighting units whose method of tactical employment will use aircraft as part and parcel of their operations* . . . . These air vehicles must be equipped with rapid-fire machineguns and powerful rockets as well as with the most modern means of providing reliable target acquisition."

In his role as Commanding General, U. S. Continental Army Command, last year General Powell, upon order of the Department of Defense, set up the Army Tactical Mobility Requirements Board, under Lt Gen Hamilton H. Howze, which conducted a thorough and comprehensive examination of the Army's needs in the field of aviation. The final detailed, classified report of this board was submitted to the Pentagon for study and consideration.

Already, machinery has been put in motion for the implementation of a number of this board's recommendations, many of which the four-star aviator has long expounded in his endeavors to constantly improve the quality of training and the ready combat effectiveness of the U. S. Army.

In the President's budget message to the Congress this year is a request for funds to provide 15,000 additional training spaces in Army strength and additional Army aircraft for testing the airmobility concept.

While General Powell has made no attempt to prophesy what will come about in the future, he has emphasized repeatedly that the Army's mobility must approximate its firepower. Otherwise, the Army's firepower cannot be properly exploited against an enemy; nor can redress be taken to minimize the effect of the enemy's firepower against our forces.

"A modern Army," General Powell says, "must have a high degree of elusiveness to avoid becoming an atomic target while at the same time possessing the flexibility necessary to exploit its own weapons, regardless of the type war being fought.

"The only effective way of achieving this elusiveness and flexibility—in balance with firepower—is through concentrated effort toward an adequate airmobility capability."

New Entry Sets "Kentucky Derby" Record

A Kentucky National Guard helicopter pilot and mechanic recently completed a 3,500-mile helicopter flight which broke previous Army distance records for flying from one point to another. On a section of their flight from Stockton, Calif., to Frankfort, Ky., Lt Col John I. Faulkenberry and SP-5 William H. Canon traveled a total of 2,700 miles in 9½ days. Previous Army records covered only 2,200 miles.

Preparations began for this long flight when the Army ordered the Kentucky National Guard to turn over to Active Army units two OH-13E helicopters in exchange for two OH-23B helicopters.

One copter exchange was simple: an Army Aviator from Fort Hood, Texas delivered a new Hiller model to Frankfort and then flew the Bell model back. Exchanging the second copter was the problem. The OH-13E had to be delivered to Fort Hood, and its replacement had to be picked up at Sharp General Depot at Stockton, Calif.

Gasoline was the biggest problem on the return trip. A full tank of gas would last only 1 hour and 20 minutes. Specialist Canon brought along a 5-gallon gas can, which in several instances enabled them to make it from one airport to another. Even with the 5 extra gallons, on two occasions they didn't have enough gas to make it to the next airport. Both times they were able to land next to a service station on the highway and buy an extra 5 gallons of gas. The copter will run on premium gasoline, but not as well as on the high octane airplane gas, so highway gas stops were made only in an emergency.

Most of the problems on the trip proved to be minor.

Effective and full-time maintenance was very important. Mechanically, the only serious difficulty on the trip was with the generator, which became defective and let the battery go dead.

Although they broke the Army distance records, the final summation of the trip by the pilot and mechanic was a happy but tired, "fatiguing."

These stories have a lesson for all Army Aviators—guard against complacency and a nonprofessional attitude while flying.

But I Thought . . .

Captain Russell J. Johnson

MANY YEARS AGO while visiting the local airport, I watched an old open cockpit biplane doing aerobatics high overhead. It put on quite a show, and then it started slowly down in a very gentle spiral. The plane continued its spiral all the way to the ground, not to a beautiful landing, but to a crash that demolished it.

At the hospital, the *two* pilots who were flying the plane when it crashed were asked the usual question: What happened? The pilot who was flying from the front seat said, "I don't know. Ask the guy who was in the back seat; he was flying."

Everybody went over to hear what the other pilot had to say. You guessed it. He said, "I don't know. I wasn't flying. The guy up front was; ask him."

When the two were brought together, they looked at each other and said, "But I thought you were flying." It sounded funny at the time and everybody had a big laugh over it, except the owner of the plane.

Over the past years I have heard of the same thing happening over and over again to other pilots. It's no longer a subject to laugh about. Those two pilots did just what so many pilots do today, sit back and take things for granted.

In the open cockpit days, it was a common practice for whoever was flying to shake the control stick from side to side and hold up his hands when he wanted the other pilot to take over. The story you have just read shows that the signals were not received, so each "thought" the other was flying.

It is now some 20 years later, and have things changed any? Well, perhaps, but let's see. Here are some recent examples of "but I thought."

The instructor tells his student to start the engine and he'll be with him in a minute. When the instructor does get into the back seat, the aircraft starts down the strip while he is still strapping himself in. (The instructor without knowing it had opened the throttle about halfway with the sleeve of his field jacket.) The instructor thinks the student a bit eager this morning, as they go bouncing along down the strip. With the trees getting closer he exclaims to his eager boy, "You had better open the throttle and get this thing off the ground before we hit the trees." And what does he hear? "But I thought you had it, sir."

Then there's the one about the two pilots flying an OH-13G. After flying from the Div C.P. to a field strip, the pilot of our helicopter lands to drop off his passenger. The pilot is new to the aviation company and hasn't had a chance to meet all the pilots. When he is asked by one of the older pilots for a ride back to the home field, he was happy to oblige.

Off they go, flying at about 500 feet over the treetops, headed toward the home field. The chopper pilot looks over at his passenger's senior pilot wings and tells him to go ahead and fly it. The other pilot looks at him a little strange and replies, "OK, if you really want me to." The chopper continued along for awhile before losing altitude; then the rpm started to go down past the red line. Just before the chopper would have

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Captain Johnson, a student at the University of Southern California Safety Course when this article was written, has more than 4500 flight hours.

hit the trees, our chopper pilot took over the controls and saved the day. The older pilot, a little pale now, tells our new chopper lad, "That was the first time I have flown a helicopter. I was waiting for you to take over." The white faced dapper pilot then responded, "But I thought you were chopper rated."

The next one is for all instrument pilots: The plane taxied out to runup position for runway 5 right. This was to be an instrument checkride. Weather 300 feet overcast, 1½ miles, rain and fog with destination 2,000 broken and 10 miles. No sweat? Well maybe. Just before takeoff the pilot asked the IP for the charts to check his routing. He had received his clearance from the tower. The check pilot replied that he didn't have any and asked where the pilot's charts were. His reply, "But I thought they were on board."

After sending back to operations, by way of the tower, for his charts and letdowns, they took off into the overcast. Some five minutes had gone by after takeoff when the check pilot found the omni still set up for ILS, although they were supposed to be on a victor airway. Asking the left seat pilot why it wasn't set up before takeoff, the reply he received, "But I thought I had set it up."

They were now off course and a call to center was in order. They continued on to their destination, which was VFR, and had to make a crosswind landing. The plane landed on the left main gear, bounced up again and came down on the nose gear, then back on the main gear. The landing was nearer a crash than a landing. The check pilot was later heard saying to the pilot, "I thought you were current in the aircraft."

These stories are true, and there are more I could put down, such as, "But I thought you . . . checked the gas and oil . . . brought the maps . . . checked the form . . . closed the flight plan . . . put the gear down . . . ."

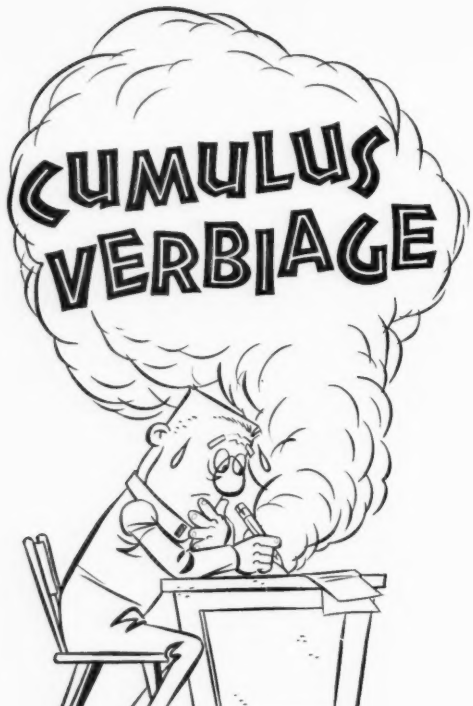
Maybe times haven't changed any, just the type aircraft, but it's about time something was done.

Today a pilot has got to be on his toes all the time. What with flying IFR, and jumping from fixed to rotary winged aircraft, pilots must stop taking things for granted. One of the best ways to do this is check and doublecheck everything before you fly, while you're flying and after flying.

If you are flying copilot, don't just sit back and take for granted the pilot has checked everything, but go ahead and help him out by checking as if you were making the flight by yourself.

The aircraft checklist should always be used, but don't stop there. Check and doublecheck every part of the flight and you'll never be the one saying, " . . . but I thought."

Taking off for a perfect flight? Or will you have to say, "But I thought. . ."



WIND WHISTLED through cracks in the wall and rattled the windows of a dispersal hut at an isolated airfield. It ruffled the pages of a manual in the hands of Lieutenant Bovine, who sat slouched in a chair with his feet on the table. Suddenly, he swung his feet to the floor and slammed the manual on the table. "Holy cow! Who wrote this mishmash?"

"What's it say?"

"You tell me!" He tossed the manual across the table to a gray haired warrant officer, who sat propped against a row of wall lockers with a flying helmet in his lap.

The warrant officer laid his helmet on the open bag beside him, picked up the manual and began reading where the lieutenant pointed. "The aircraft incorporates provisions for simultaneous hydraulic and mechanical activation of a mechanically linked eccentric arm to control vertical movements from a horizontal plane . . . ."

He read the passage again, did a double take, then waded through it a third time. "Brother!" He shook his head. "Sorry. I'm no engineer. Better ask Stan."

Bovine picked up the manual, rose, and walked to the desk at the far side of the room. Captain Brockman, seated behind the desk, was reading a magazine.

"Captain, what's this mean?"

"What's your problem?" asked the captain, looking up and reaching for the manual.

"The guy who wrote this mess can't speak English! I can't make heads or tails of it."

"Let's see if I can." The captain read the passage through twice, then carefully studied the accompanying illustration. "Near as I can make out, it means the lift will move up if you press the toggle switch up, and down if you press it down."

"Well, why in thunder doesn't it say so?"

"Beats me." He laid the manual aside and picked up the magazine he had been reading. "Give a listen to this: 'We need a systematic and objective appraisal of all operational and maintenance functions to be performed to or with aircraft involving humans and the methodical effort to adapt machines to the natural and developing characteristics of humans.' "

"Holy cow! What's that supposed to mean?"

"Means aircraft should be designed for the people who'll operate them."

"Somebody should make people write so we can understand what they're trying to say!"

"Who?"

"I don't know. Whoever puts these things out."

"Why don't *you* start the action?"

"Holy cow! Me? What could I do?"

"Write a letter." The captain glanced outside. "Doesn't look like we'll be doing any flying this morning. You could do it now."

Prepared by the United States Army Aviation Board for Aviation Accident Research.

"What good would a letter from me do?"

"Never know until you try. It just might get to someone high enough to take some action."

"Who would I write it to?"

"Write it to me. I'll indorse it on up the ladder."

"You wouldn't be kidding me, would you?"

"Not a bit. If you really want to do something about this gobbledegook, I'm all for it."

"By George, I'll do it." Bovine swung around and walked back to the table. He opened his Jeppesen case, took out a pad of notepaper and sat down to write.

Captain Brockman watched with amusement. He shook his head, leaned down to open the bottom drawer of his desk and brought out a well-thumbed copy of *Playboy*. The wind continued to whistle as he slowly turned the pages. He stopped at the "Ribald Classic" and began to read.

"Here it is, Captain."

The captain jerked erect and quickly dropped his magazine into the open drawer. "Finished? Let's see what you've written."

He reached for the letter and read:

1 March 1963

TO: CO
13th Aviation Company
Camp Faroff

SUBJECT: Aviation Reading Material

1. I find it increasingly difficult to comprehend the meaning intended to be conveyed by the preponderance of aviation reading material distributed through channels.

2. Recommend appropriate action to insure increased ability of aviation personnel to comprehend subject material.

CARL BOVINE
1/Lt Arty

Captain Brockman finished the letter and looked up. "I'm afraid you're guilty of the same crime. Reads like you swallowed a dictionary."

"I know. Seems the harder I tried, the worse it got."

"What were you trying to say in this first paragraph?"

"I was saying it's hard to understand the writing in military publications."

"Okay, let's write what you just said." The captain crossed out the paragraph and wrote in Bovine's words. "Now, how about your recommendation?"

"I recommend they be written in simple, clear language."

"Good. That's just what we'll say."

"But that doesn't sound like anything."

"Says what you want to say, doesn't it?"

"Well, yes, but . . ."

"It's in simple, clear language, isn't it?"

"Yes, but . . ."

"But it doesn't sound impressive. Is that what you mean?"

"That's it. If we send that letter, people won't think I know what I'm talking about."

"Why not?"

"It doesn't . . . Well, it doesn't sound military."

"What were you taught about making radio calls?"

"Speak clearly and keep transmissions short and to the point."

"What's the difference between making a position report and writing a letter?"

"Well, everyone—that is, most everyone, makes radio calls short and clear."

"Then what's wrong with using the same technique for writing?"

"You really think I should send this letter?"

"If you don't, I will!"

* * *

We'd like to be able to say that Lieutenant Bovine's letter went forward and accomplished its purpose. It went forward, it's rumored, bouncing from office to office and gathering indorsements until it reached an echelon in which the same officer was filling two slots of equal rank. Unable to decide which position should forward the letter, he began indorsing it back and forth from one desk to the other. The letter was lost in orbit.

Lieutenant Bovine faced a common enigma. Some quirk of human nature seems to freeze people into a rigid pose when someone aims a camera at them. The same reaction takes place when they attempt to express their thoughts in writing. And "posed" writing is every bit as stiff and unnatural as posed photographs. Neither gives a clear picture of a person *or his thoughts.*

Robert Gunning, in his book *The Technique of Clear Writing,* lists these ten principles:

Keep sentences short.
Prefer the simple to the complex.
Use the familiar word.
Avoid unnecessary words.
Put action in your verbs.
Write as you talk.
Use picturable terms.
Tie in with reader's experience.
Make full use of variety.
Write to *ex*press, not to *im*press.

DA Pamphlet 1-10, *Improve Your Writing,* can help YOU to overcome the common tendency toward clouded writing. Promotions are faster for those who can express their thoughts simply and clearly.

OUR PROBLEM

SFC John M. Gilfillan

Eliminate the cause of ground handling accidents and we solve one of our biggest and most expensive problems.

RECENTLY, a flight of twenty CH-34 helicopters landed at an airfield in Germany. One of them moved into parking position just a wee bit too close to another. As the aviator reduced pitch, the rotor blades touched.

A minor accident, you say. I guess so, if you compare it to one of those that takes the lives of many people. But look again. It cost $75,756.00 to repair the two helicopters. Is this a minor accident? And don't forget, if this had happened in combat, two valuable helicopters would have been out of commission for some time. This could easily be the difference between a successful mission or a battle lost.

The Army realizes how costly and how dangerous ground handling accidents can be and is making every effort to reduce them. The list of airport improvements important to ground handling safety is voluminous; yet, we continue to have ground handling accidents. Why?

To answer this question we must look into the reason for accidents. There is, for instance, the attitude of the personnel involved. Many persons, through their ignorance or misunderstanding, believe that accidents are the inevitable results of unchangeable circumstances of fate.

The exact opposite is the truth. Accidents are caused; they don't just happen. The basic law of cause and effect is involved. The identification, isolation, and control of these causes are the underlying principles of all accident prevention techniques. In other words, if there is no cause, or the cause can be eliminated, there will be no accident.

A simple example of this occurred recently at Fort Rucker, Ala. A line crew from the Signal Section was working on some overhead lines in front of the WAC barracks. To get to these lines it was necessary to place a ladder across the sidewalk. It was also necessary to have several ropes that hung down in

Just a wee bit too close and the bill came to $75,756

the center of the sidewalk. The work started on a Wednesday and the ladder was still there by late Friday afternoon.

Now the signal men saw nothing wrong in this. But at night it was not possible to clearly see the ladder or the ropes. Since no blockades were placed across the sidewalk, anyone unfamiliar with the situation could easily hurt himself by walking into the ladder or ropes.

An alert passerby saw the hazard and reported it to the safety officer. The safety officer reasoned that sheer luck had kept an accident from happening so far. But Friday night was pass night for the WACs and many suitors would be using the area. He had visions of these men, walking almost backward for a last glimpse of a pretty WAC and running . . . Well! No accident happened. The safety officer had the cause removed, posthaste.

Accident causes can be broken down into two different types. One is like the cause mentioned above; it can be eliminated. But others cannot be eliminated. An example of this type is the very airplane we fly. Its primary function is to fly. It was not designed as a surface vehicle and is, therefore, accident prone while on the ground. We are, of course, not in the position to change the design of the aircraft, even if possible. Combine this accident prone vehicle with a cause, even the smallest one, and we have an accident.

When you consider this, you can see that there is no place for hot rodding in an aircraft, especially if it is on the ground. Nor is there any place for overconfidence and complacency. This overconfidence and complacency seems to be a disease of aviators. Many aviators get so used to their aircraft that they think of it as a part of their body. When they taxi in, they feel they could not possibly scrape the wings anymore than they could scrape their shoulders when walking by a telephone pole. The number of taxi accidents of this kind shows how wrong they are.

The cause? Daydreaming. The result? Total loss of one APU.

Some aviators become so complacent about taxiing that they fail to keep their minds on the business at hand. They daydream about the pretty blonde or they idly watch another aircraft take off. Some aviators even start doing their post-trip paperwork.

Complacency—and one taxi light down the drain

Perhaps I am not being quite fair here. It might be that after the trials of lifting an aircraft into the air, flying halfway across the country, and then setting it down again, an aviator has a sort of letdown. The big danger is over, taxiing in is commonplace, and a bit boring, etc. But taxiing is dangerous and the aviator's job is not over until the aircraft is safely in bed and the log closed.

Among ground crews, taxiing troubles seem to center around the lack of skill, experience, and judgment. Few of them realize what is involved when an aircraft is moved on the ground.

Take the little matter of taxi speed. It is a major contributor to accidents, so much so that in TM 1-250, ten rules are listed for the prevention of taxiing accidents. Of these, three are devoted to speeding. Normal taxi speed is about that of a brisk walk, or a little more than 5 mph. But to an aviator used to flying at speeds of 100 miles or more or to a crewman who is used to driving his automobile at around 60 miles per, this seems excessively slow.

In addition to the many accident causes found in taxiing aircraft, aircraft movement by auxiliary power is also dangerous to personnel and equipment. Each type of aircraft requires special instruction for towing. Some, like the O-1, are light enough in calm weather that they can be moved by hand. Others like the Caribou are quite heavy and need tractors. Unfortunately, fundamental procedures which apply to all airplanes often are neglected and result in personal injury and/or damage to equipment.

Civilian airlines have studied this problem and have come up with a set of basic rules well worth considering.

- In open areas, two people are required: one person on the tractor and one in the cockpit. In congested areas, three additional people are required: one watching wingtip clearances for each wing, and one watching nose and tail clearances.
- When practicable, move all objects from the path of the aircraft.
- On tricycle geared aircraft like the Caribou, disconnect nose wheel torque links. On other aircraft, unlock tail wheel.
- Check landing gear handle in down position.
- Check to see that all landing gear locks are in place. If power is available on the aircraft, check for a gear down and locked indication.
- Check hydraulic pressure available for brakes. If hydraulic pressure is not available, then it will be necessary to station a man beside each main gear with chocks in the event trouble occurs.
- Retract flaps. If flaps cannot be retracted, an additional man is required to relay signals from the person watching the tail or nose clearances to the person driving the tractor.
- Check for doors, plates, etc., that may fall from the aircraft during towing.
- If towing aircraft at night, turn navigation light on.
- Tow aircraft very slowly; even 5 mph can be too fast at times. Do not attempt to make a turn that might cause towbar and tractor to jackknife. Use extra care when towing aircraft in adverse weather.
- Operate the tractor smoothly. Do not jerk the tractor or

Sandpiles are fun for a child, but an airplane isn't a child

put excessive strain on the aircraft.

- Whenever practical, pull the aircraft instead of pushing.
- Do not use aircraft brakes for steering during towing. If it is necessary to use the aircraft brakes for emergency, use them equally to avoid swerving.
- All commands between tractor and cockpit should be oral. No hand signals permitted. Wing and tail clearances to the tractor operator should be transmitted by hand signals.
- Whenever possible, keep the inside wheel or wheels turning slightly on sharp turns to reduce stress on the gear and tires.
- Chock wheels before disconnecting the tractor from the aircraft.
- Turn navigation lights off if used.
- Use good sense during all towing operations.

NOTE: Never use a cable or rope when towing an aircraft with a tractor or tug, even though brakes on the aircraft can be used. There are no bumpers on an aircraft like on an automobile.

But supposing the man in the cockpit is a good aviator or mechanic? He follows all the rules. He moves his aircraft at a slow speed, makes S turns when necessary to afford maximum visibility and asks for wing walkers in windy weather. But one night while taxiing, his left wheel hit a chuck hole on the edge of the runway. A slight wind was coming from his right. The combination of the two caused the upwind wing to lift and the downwind wing to touch the ground. Minor damage was incurred by the airplane.

Who is to blame in this case? Not the aviator, because he was following all the rules. The wind was not enough to require wing walkers; the speed on the open taxiways was not excessive. If he had been moving faster than the prescribed speed, of course, the damage would have been extensive.

Perhaps the airfield personnel are to blame. It is their responsibility to see that the airfield is maintained in a safe condition. Unmarked or poorly maintained shoulders on runways and taxiways; poorly planned parking areas with not enough space between aircraft and inadequately lighted; obstructions improperly marked; buildings, telephone poles, fireplugs, and signs too close to taxiways all contribute to the accidents sustained on the ground. All these conditions are the responsibility of airfield personnel.

To get these accident causes corrected, regular procedures must be followed, especially where the work done requires large sums of money. But often these procedures are not brought to the attention of the proper authority or are not initiated promptly when they are. Daily inspections of airfield facilities and prompt maintenance when a hazardous condition is revealed are necessary. After any construction or maintenance work the area must be inspected to remove contractor's equipment, level dirt mounds, fill in ditches, etc. The area must be inspected after storms or periods of heavy rains. Special attention should be paid to the overrun areas and natural drainage areas to check for soil erosion. Runway areas under construction must be checked continually to eliminate dangerous obstructions.

The airfield commander, the operations officer, the flying safety officer, and the installation engineer are the key men in this inspection program. But all personnel assigned to the field should consider themselves a team to eliminate hazards to aircraft using the field.

Dangerous little objects in the path of an aircraft

Commanders are, of course, all interested in reducing the number of ground accidents. They have tried many ways. One method is a continuing training program for personnel involved in ground handling of aircraft. This is good.

But no training program on this subject can be effective unless the commander is able to get across to each man a feeling of safety mindfulness. His talk, his actions, his thoughts should always be oriented toward safety. When a man under his command discovers and corrects a hazard he should be congratulated and praised. Conversely, when a safety rule is violated, even if no damage was done, the offender should be criticized.

The number of ground accidents is the problem of all of us. Higher headquarters is making a major contribution to the reduction of these accidents. The rest is up to us.

Cockpit Lighting

Captain Walter T. Parkerson

RED OR WHITE? Cockpit lighting systems are a controversial subject among the services. One group, primarily Navy, advocates continued use of *red* lights. The other, primarily Air Force, recommends a switch to *white* lighting. Both have sound reasons for their views.

Continually developing new and improved aircraft systems and striving for the best available, the Army finds itself in the middle awaiting a final solution.

Cockpit lighting is important because it determines to a large extent how well instruments, charts, etc., are seen inside the aircraft *and how well objects are seen outside the aircraft.* For reading instruments and charts, aviators are primarily dependent on *light* adaptation by the central retina, while outside visibility is primarily dependent on *dark* adaptation by the peripheral retina. These two processes are antagonistic. Generally speaking, raising the level of one lowers the level of the other and vice versa.

Dark adaptation, essential for good night visual acuity, allows the pilot to see dimly illuminated objects outside his cockpit. This process, requiring 1-2 hours to reach its maximum, begins very rapidly after exposure to darkness. About 60 percent of maximum night visual acuity is attained in the first five minutes. Thereafter, improvement of night vision (or the change to a higher level of dark adaptation) is gradual.

Whatever the level of dark adaptation, exposure to light of higher intensity than that minimally seen can cause a reversal or shift to a lower level of adaptation. The entire process can be completely reversed by exposure for about two minutes to bright light. Aviators should be aware of the consequences of gazing at flares and city lights and using flashlights without red covers while flying at night.

The color of illumination also has a direct influence on the state of dark adaptation. The shorter the wave length of the color, the lower is the level of dark adaptation. This means we do not see as well in the dark when exposed to increasing light intensities of colors such as violet and blue, and to white light which has short wave length colors in it. Conversely, we can see progressively dimmer objects after exposure to light of decreasing intensity and of a color such as red.

How important are colors of cockpit lights? When intensities are kept at identical levels and only the colors varied, differences in the state of dark adaptation are small. However, time required to reach these levels of adaptation is of significantly longer duration with white light and lights of short wave length than with red light.

Regardless of color, instrument panel lighting makes it almost impossible to become completely dark adapted. Often moonlight and starlight also play a deterrent role.

Minimum, normal, and maximum red light intensity values for proper instrument panel illumination and instrument interpretation have been determined for indirect red and flood red lighting, as have the levels of dark adaptation to red light for these intensity values. Statistically, there was no difference between dark adaptation level caused by indirect red or flood red systems. However, these change to significantly lower adaptation levels when measured in flight while the aviator was exposed to external light from a clear moonless sky. The fact that sky light lowers the level of dark adaptation more than the red lighting system does would seem to indicate that white instrument lights would lower the level of dark adaptation even further. But equal perception of instruments can be obtained at lower intensities of white light than of red

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Capt Parkerson is a flight surgeon attached to the Human Factors Section of the Analysis and Research Division, USABAAR.

light. Furthermore, the instruments are not steadily fixated while flying and therefore have less effect on adaptation levels than would be expected.

A new type of lighting system is now being investigated. This is the Electro-luminescent system. It has advantages in that it produces less instrument marking shadows and gives an even distribution of glowing light over the markings. The instruments are read easier and interpreted as well as present systems at lower light intensities. Also it is lighter and less electrical power is required. The luminescence may be any color desired.

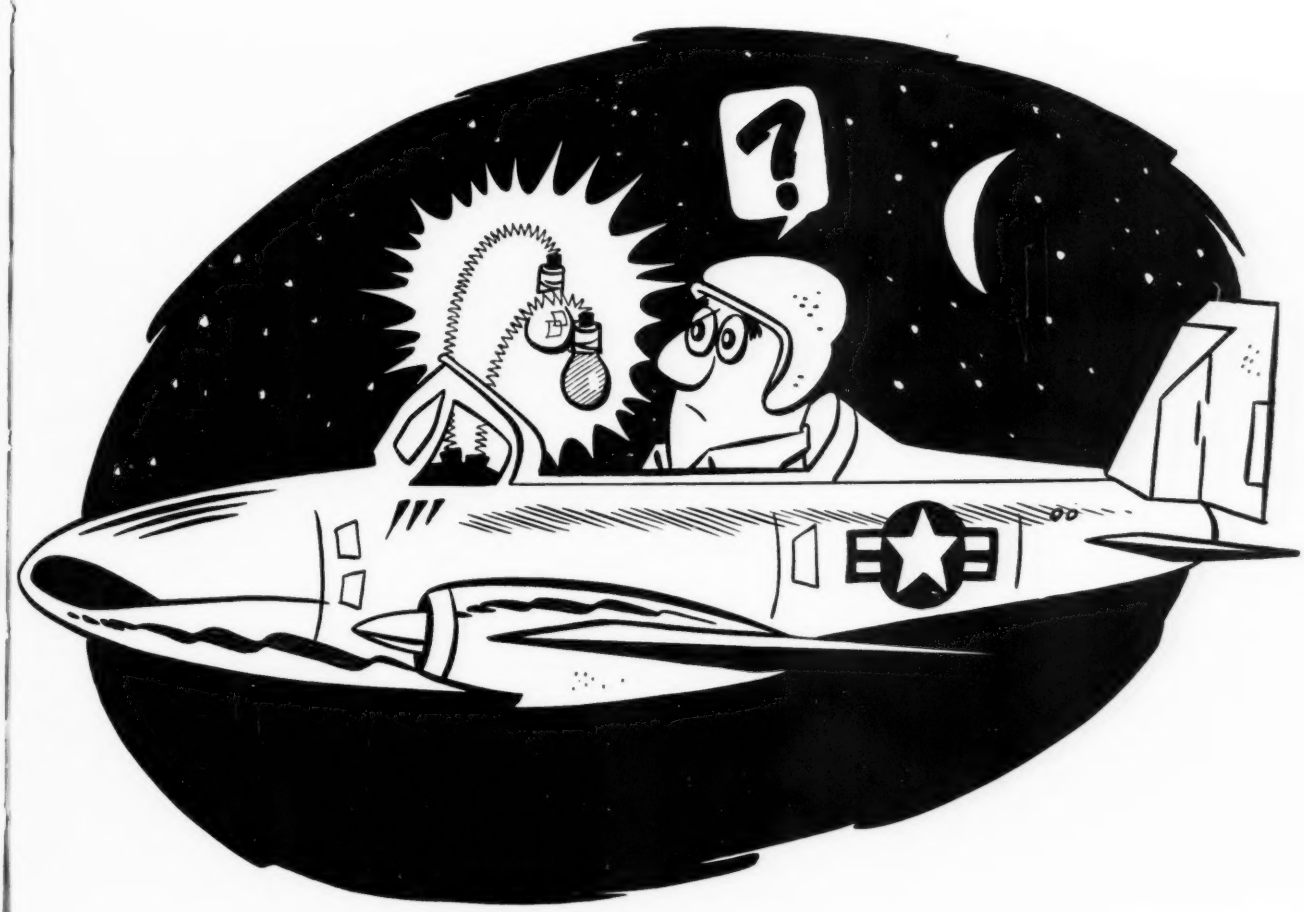
Those who support continued use of red lighting systems generally give one or more of the following reasons:

- Better dark adaptation.
- Maximum dark adaptation is often needed to spot other aircraft and objects on the ground.
- Red light systems have worked well in the past and are of proved value.
- Less time is necessary to enhance dark adaptation.
- There is less chance of losing dark adaptation.
- A change to white light systems may cause misinterpretation of instruments through habit influence.

Reasons given for supporting the use of white light systems are:

- Pilot can read charts and instruments better at lower levels of light intensity.
- Dark adaptation is not as important when instrument flying or flying high performance aircraft at high altitudes.
- White light induces less fatigue.
- White light results in less reflectance.
- Less aircraft electrical power is needed to operate a white light system.

The controversy created by these opposed views will not be successfully resolved until further experimental studies are undertaken and completed. Even then, it is highly probable that no one system will be best for all aircraft and all types of missions.



PCS to USAREUR? Here's some information about weather, terrain, navigation and flying conditions that will benefit you.

Letter From An AA

Lieutenant Colonel Melvin C. Monroe

Dear Joe,

I just learned that you were coming to Germany. You've already heard about the beer and the beautiful frauleins, so let me mention a few things about the flying over here. We found that many of the units rushed over here last autumn were not fully prepared to fly in this theater without a rather lengthy checkout.

You will find these procedures quite different from what you're used to in the States, and you'll be due for many surprises by the time you complete your USAREUR checkout. There's quite a bit more to it than a glance at the checklist would indicate. Since you already have quite a bit of flying under your belt, you'll be even more likely to stumble over some of the procedures in effect here.

Instrument flying is perhaps the simplest, if you're in clouds and won't be able to see the other 999 aircraft flying here. Once they clear you to go, the controllers have to take care of you and that's a big help.

IFR still means "Instrument Flight Rules" but don't presume anything beyond that. You can still be IMC (Instrument Meteorological Conditions) or VMC (Visual Meteorological Conditions) and it makes quite a difference, as you may be cleared right past another aircraft if the controller has determined that you can do it VMC.

Your clearances sound like nothing you've ever heard before and, at first, will be difficult to understand. It will be handy to have a copilot along who can interpret, once you bog down in the clearance. Eventually your ear will become attuned to this brand of English and then you'll be OK. Incidentally, this is a good place to get good, honest "W" time toward that special ticket.

You may be cleared to "Flight Level 50," which gives you only a vague reference to your height but will keep you vertically separated from all other aircraft in the area since you'll all have 29.92″ set on your altimeters. If you fail to reset during an instrument approach through a low ceiling you

- may level off and execute a missed approach too high, if the altimeter setting is above standard; or
- bring it too low and begin picking up tree branches while your altimeter still indicates "No Sweat," if the barometric pressure is below standard.

Your Jep still looks like a Jep, but remember one big difference: you're not in the wide open spaces of Texas but trying to operate in a pretty cramped area, and your Jep is full of re-

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Col Monroe is Aviation Officer, Headquarters, VII Corps, APO 107, N. Y.

strictions and regulations galore. So read it carefully.

Your approach sheet for a given airfield isn't all inclusive. After looking over the letdown procedure, you still have to go somewhere else for USAREUR-specified minimums for Army aircraft. That's because the sheet has no column for "NO Glide Slope," and some airfields just don't have any minimums specified.

Distances are short enough here that once the approach controller turns you loose, you talk directly and effortlessly to the center controller, thanks to that wonderful ARC-73. These controllers are good and are playing the game as hard as you are. Fight the problem and they'll quote you chapter and verse and hand you a violation. Show them your willingness to cooperate and they'll go to any length to help you.

Don't be alarmed if the controller clears you via "Victor Red 11." Your first impulse will be to ask him to make up his mind. Really, he's not shook at all. The original airways here were "colored" airways extending between low frequency beacons or range stations. Now omnis are being added to the same general routes. If the Victor airway approximately parallels the colored airway it is now separately numbered but may be designated "Victor Blue 6," for example. If the clearance designates a Victor airway then, of course, the distances between omni stations are used. However, one segment of "Victor Red 11" extends from an omni station to a low frequency beacon. This may seem a bit odd, but is best explained by the frequently heard term "Mox Nix."

Unfortunately, a terminal area will have one identification for the beacon, another for the omni, and still a third for the localizer.

The initial callup on the ground is made on "taxi" frequency, or what you know as "ground control."

The weather forecasters delight in pointing out that the worst weather in the States is better than the best in Germany, so keep your instrument ticket current and your raincoat handy.

In Germany we have two items called TCP. One is that stuff they put in gas tanks so that all Army reciprocating engines can burn 115/145 octane gasoline. The other TCP stands for Theater Commander's Prerogative. You may think you know Army regulations and get tripped-up by a USAREUR regulation that reads a little differently. So study all the pertinent regulations carefully.

VFR flying is quite an experience. It's a broken-field run all the way, with few straightaways. To start with, you'll need a controlled clearance to get out of the control zone. These are a whopping 8 miles in radius and you must report when departing the boundary.

Once you're on your way, you're OK until you approach the next control zone and go through the clearance drill all over again. VFR is greatly assisted by the presence of ADFs in the O-1. However, pure pilotage for the newcomer will at first be disturbing and embarrassing. All villages look alike and there must be ten thousand of them. The map indicates one and you'll see a dozen. Therefore, you must start navigating as soon as you leave the traffic pattern and keep up with the map every minute of the time. If you become distracted by the scenery, the passengers, or the radio, you'll soon be lost.

Pilotage is still an art and it calls for attention to all details of the map.

This sounds like something you outgrew once you finished primary flight training, but high ranking generals do get scattered all over the maneuver area because so-called VIP pilots have spent all their time navigating with radios and can no longer read a map.

Everyone needs a border orientation so he won't wander across. This border crossing is serious business. For planning purposes, if you do stumble across, regardless of how good the excuse, plan to turn in your flying suit. Others have.

Night flying also has its peculiarities. ICAO (International Civil Aviation Organization) rules do not recognize night VFR but the Germans do permit us to file "Night Tactical." That means you fly below MEA if on airways and call major airfield towers a long way out. The area of positive control at night extends out to the limits of the Departure Control Area, a distance of about 25 miles.

Flying in Germany has its compensation. You fly over country that's as pretty as any artist's painting. The autobahns, which pilots used for landings in the so-called "Good Old Days," are as crowded as the busiest stateside freeway. Once you've seen a wrinkled Volkswagen, you'll be doubly glad that you go by air.

Well, Joe, the above is certainly no formal presentation of the USAREUR checkout, but it was intended to give you some idea of the differences you'll find over here. Let me know when you're due in so I can meet you.

As ever,
Mel

NEWS AND VIEWS

FROM THE U. S. ARMY AVIATION FLIGHT INFORMATION OFFICE

The Exam-O-Gram is a training aid that covers specific operational situations and related aeronautical knowledge similar to those encountered in the examinations for FAA pilot licenses. They are, in effect, simulated flights, including emergencies and air traffic control procedures, and are considered of potential value to the professional airman.

Exam-O-Gram No. 2

Situation

You plan to make a VFR cross-country flight over terrain which has an approximate maximum elevation of 2,900 feet. After charting the course you determine the true course to be 188° and the magnetic variation is 12° E. According to the latest aviation weather reports there is a broken layer of clouds at 7,000 feet, and the visibility is unlimited along your intended route. The winds aloft forecast indicates that the higher the altitude, the more favorable the wind direction and speed. Intending to take advantage of the wind and still comply with Civil Air Regulations, you decide upon a cruising altitude of:

1) 5,500 feet MSL
2) 6,500 feet MSL
3) 7,500 feet MSL
4) 9,500 feet MSL

Analysis

1. You wish to fly as high as legally possible to take advantage of the wind.
2. The base of the broken clouds is reported in height *above the surface* (see "Pilot's Weather Handbook," page 79). Therefore, the base of the clouds is approximately 2,900 feet plus 7,000 feet, or 9,900 feet above sea level.
3. Cruising altitude is a level above mean sea level, MSL. (See definition in CAR, Part 60.)
4. This flight will be made at an altitude of 3,000 feet or more above the surface in order to take advantage of the more favorable winds at higher altitudes. Since you will be flying at 3,000 feet or more above the surface, you must, according to Civil Air Regulations, fly at a cruising altitude appropriate to the magnetic course. In this instance the magnetic course is 176° (true course 188°-12° E magnetic variation = 176°—see "Path of Flight," Chapter II, page 7.
5. A magnetic course of 176° in this case requires that you fly at an altitude (above sea level) of an odd thousand plus 500 feet (see CAR, Part 60, Section 60.32).
6. You must maintain a vertical distance under the base of any cloud formation of at least 500 feet (see Part 60, Section 60.30). This rules out a cruising altitude of 9,500 feet. You do not choose 5,500 feet since you want to take advantage of better tail winds at higher altitudes. You eliminate 6,500 feet because you must be at an odd thousand altitude plus 500 feet. Therefore, you select a cruising altitude of 7,500 feet, which meets legal requirements and gives you the advantage of more favorable winds.

This Could Be Your Life
Learn To Stay Alive

Because of increased radius of action by Army aircraft in today's operations, their use in remote areas, and increased complexity of the equipment, survival is becoming an important subject to Army Aviators. The Army Aviation School's survival course was inaugurated to inform all newly trained Army Aviators in basic techniques to increase their chances of survival in case of an emergency. The next step in the expansion of this broad subject will be to include escape and evasion within the course.

When your aircraft hits the ground the hard way and you come down under the big silk, will you survive—or perish? The difference may be found in a generous safe margin of knowledge—or it may hang on a hairline thread of luck.

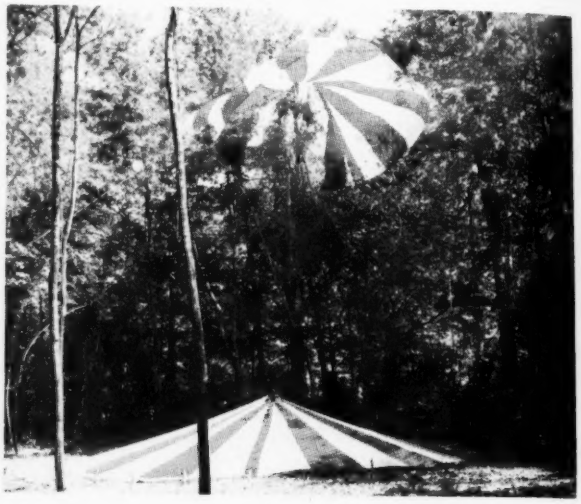
Usually, after an emergency, knowledge is the difference between living and dying. For instance, there is the problem of bailing out of the aircraft. Since 60 percent of injuries are incurred during exit from the aircraft or on hitting the ground, it follows that the aviator must know how to use his parachute.

And there is the problem after landing. Far too many aviators in the Army today have no survival knowledge.

The pictures shown here were taken at the Army Aviation School's new survival course, prepared and taught by the Department of Tactics.

No brief coverage of survival such as this can be complete for all areas of the world. Each aviator should study the particular area to which he is assigned to see how the general principles apply there. He should make up a personal survival kit adapted to the area in which he is operating.

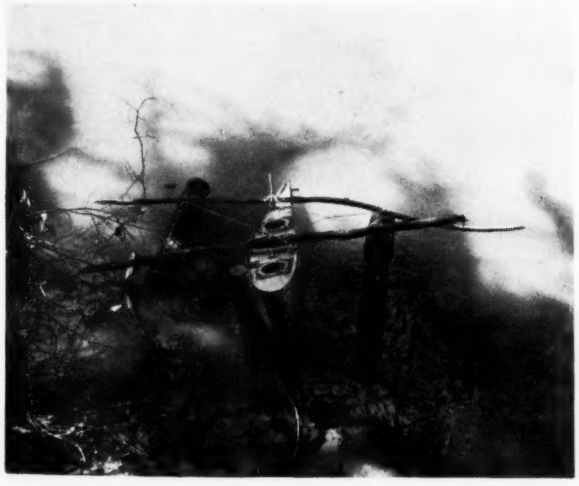
Rescue parties will begin looking for you shortly after you declare an emergency, or after it is determined that your aircraft is down. After caring for the wounded, your next act is to help the rescue parties. Build three signal fires, making as much smoke as possible. Put out parachute strips to make international signals like those on the back of your sectional chart. Stretch out a parachute in a clearing, or place one in a tall tree,



over a stream, or any place where it can be seen from the air.

You can improvise shelter from parts of your airplane, your parachute, or from natural materials found in the vicinity. The kind of shelter you make depends on whether you need protection from rain, cold, heat, sunshine, or insects.

Pick your camp site carefully. Try to locate it near food and water, especially water. Don't make camp at the base of steep slopes or in areas where you run the risk of avalanches, floods, rockfalls, or battering by winds. In tropical areas, don't sleep on the ground. Make a hammock from your parachute. Shown here is a lean-to made from natural materials, a para-tepee, and another lean-to made from a parachute.



While you wait for rescue, you must eat. If you are in a wooded area, much food is around you, but you must catch it. Shown here are several tried and true methods. The first is a trap made from sticks with a figure four trigger. The second is a deadfall with the same kind of trigger. Deadfalls are very effective and can be made with heavy logs instead of stone as shown here. Most streams contain fish. These can be caught with

hooks made from scrap metal or even hand-carved wooden hooks. A most effective method is the fish trap. It is made from a parachute and placed in a stream with the open end facing upstream.

Sometimes you will need a boat to catch fish. The one shown on the left was built from parts of a fallen airplane. And then you must cook the food. Sear the meat first in the flames to seal in the natural juices, and then cook slowly on the end of a stick. Use roots and other plants for vegetables and make them into a soup. Be sure to cook all food well.

Most important—keep busy. If you have provided shelter for yourself, built signal fires, and found food, go back and start over. Improve your shelter, find more food, and gather more wood. But by all means—keep busy.

I came of age on my son's birthday

Anonymous

IT WAS MIDSUMMER at an overseas base. General flying conditions were not unlike those in the United States for the time of year—warm, clear mornings, haze in the afternoon, and the usual crop of thunderbumpers.

I had just returned from a 3½-hour administrative flight and walked inside when the operations officer asked me to take a short flight to our division headquarters. I was to pick up a clerk and return him to our field.

It was near noon so I drove to my quarters for lunch. During the meal, my wife reminded me of our son's birthday party scheduled for 3:30 that afternoon. She wanted me to pick up a roll of film and some flashbulbs from the PX on my way home. I told her there would be no problem as I had only one flight scheduled and would be back in plenty of time for the party.

Driving back to the field, I noticed a few buildups to the north and west. When I arrived at the field, I found I had a passenger to carry on the outbound flight.

We were scheduled to depart at 1300. However, it was almost 1400 before my passenger arrived. Still time enough to make the flight and get back to the party, but it would be close. The nice weather of the morning had deteriorated to light rain. I checked the destination weather and learned it was clear with a heavy shower to the north.

Preflight completed and my passenger strapped d o w n, we were ready to roll. The takeoff and climb to altitude were normal. Visibility was down because of the rain, and there was a little more turbulence than there had been during my morning flight.

Halfway to destination, heavier rain forced first a left, then a right detour before I finally found my way into the landing pattern at the division strip. Except for some water on the runway, my approach and landing were made with no sweat.

Getting out of the Bird Dog, I didn't like the looks of the weather at all. And a cup of coffee and call to home field didn't help. A heavy rain shower had just left the field and more appeared to be coming down from the northwest. The operations officer advised me to hold tight and that he would call as soon as the weather cleared.

I asked if the field was VFR and he replied that it was. I then told him I would be inbound as soon as my passenger arrived and rang off before he could answer.

With one eye on the weather, I spent an impatient 30 minutes waiting for my inbound passenger. Finally he arrived, carrying stacks of papers and reports.

We loaded the plane, and I filed for home while he got aboard. The clearance officer wasn't too happy, but it was legally VFR and all he could do was suggest that I wait. After a short discussion, and many promises to execute a 180 at the first rain drop, I was grudgingly given approval to try for home.

My passenger was all set to go. He made me angry with a remark that he just had to be back at post headquarters no later than 1500. Of all the nerve! If he hadn't been late we would have been on the ground there by now!

Preflight — kick the tire and light the fire — and airborne again. Climbing out, the first thing I noted was a long band of rain directly in my path. It was about 10 miles ahead. I figured it to be less than a couple of miles thick and less than 10 minutes flying time from the home field. I decided we could fly through it easily in not more than two minutes.

Selecting the lightest flight path through the rain, I flew into it. The first 20 seconds or so were relatively easy. My pas-

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Submitted by the United States Army Aviation Board for Aviation Accident Research.

senger asked a question and I had turned to tell him to use the intercom when all hell broke loose.

My first indication that something was wrong was a loud cracking noise. Jerking my head around, I saw the vertical speed indicator passing 1,500 fpm climb. The engine sounded as if it were running away. Airspeed was low, there was no control response, and the altimeter was winding up like a top, passing through 3,500 feet.

I couldn't believe what had happened. A few seconds ago I was at 1,800 feet msl, and now I was almost to 4,000 feet.

We went into the clouds, still with no control, low airspeed, and high rpm. I frantically chopped power and shoved the stick against its forward stop. No reaction!

The passenger in back was yelling something, but I couldn't take time to answer. I tried to remember my instrument training back at Rucker. "Keep the wings level," I told myself.

"Watch your heading!" Heading? It was 260 when this all started, and now it was passing through 350 and turning faster. "Ease in rudder, get the wings level, and watch the airspeed. The next downdraft will be here any second."

Suddenly the seat dropped away and everything flew apart again. The vertical speed needle fell to 1,000 feet, then dropped faster through 1,500 feet to 2,000 feet! The altimeter started to unwind as I came in with power and hauled back on the stick.

We left the clouds in a screaming spiral to the right. I fought the wings level and added power, pulling back on the stick with all my strength. At this time, the only thing I could think of was the birthday party I was going to miss.

Slowly, ever so slowly, the nose moved up through the horizon. The altimeter slowed and held at 1,000 feet. Terrain in the area averaged 700-1,200 feet. We were close to the ground, very close!

Suddenly the seat slammed into my buttocks again, and off we went into another climb. Off with the power and nose full down. Hold on!

This one wasn't as bad as the first and I managed to stay out of the clouds. Quickly as it had come, the worst was over and we sailed out into sunshine and calm air.

The airspeed was low so I added power to cruise rpm. Still shaking, I checked the wings and gently started a turn to check control response.

I began to look for a familiar landmark and spotted home field just ahead and to the right. I was completely wet from head to toe and realized I had been holding my breath for a very long time.

Turning on the downwind, I called for and received landing permission. It was the best approach and landing I've ever made, before or since.

Taxiing to the ramp, I suddenly remembered my passenger and looked back. His headset was down around his neck, his glasses were hanging from one ear, and he was covered with scattered papers. His eyes were tightly shut and his fingers were white where he grasped the window supports. It should have been funny, but all I felt was shame.

Pulling into my parking spot, I cut the mixture and went through the shutdown checklist with great care. We got out and the passenger and I silently gathered up his papers. From his look, I knew that Army Aviation had lost a friend. I wondered how many other people would hear his story.

I finished up my paper work and drove to the PX to get the film and flashbulbs. I was a little late getting home but the party was going strong and no one noticed.

Later that evening I faced my second moment of truth. I realized that through my own stupidity I had risked my life and that of a passenger entrusted to me. Then and there I made up my mind to become the oldest, safest pilot in the United States Army.

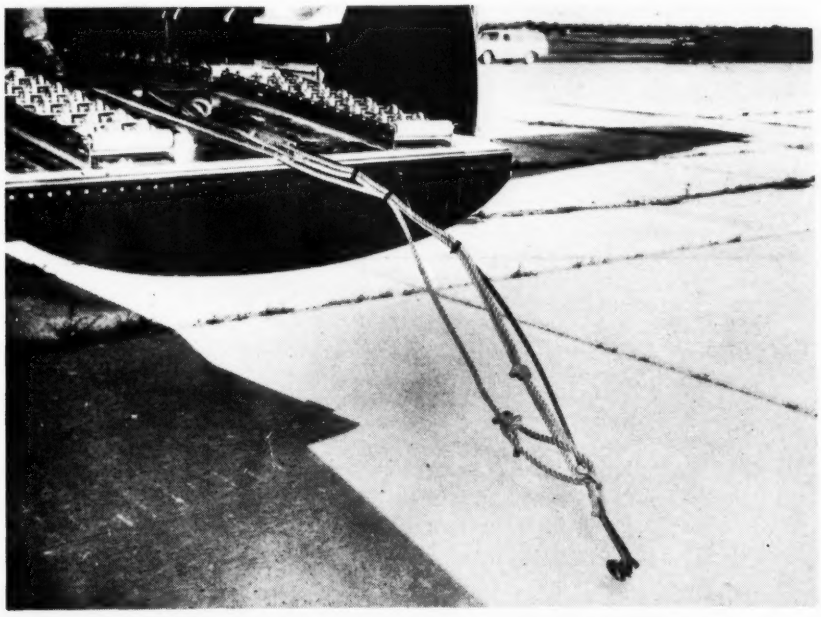
Ask not what Army Aviation can do for you, but what YOU can do for Army Aviation.

[We do not suggest that aerial delivery of personnel be accomplished in this manner. Art and copy submitted anonymously. Editor]

TOUCH and GO

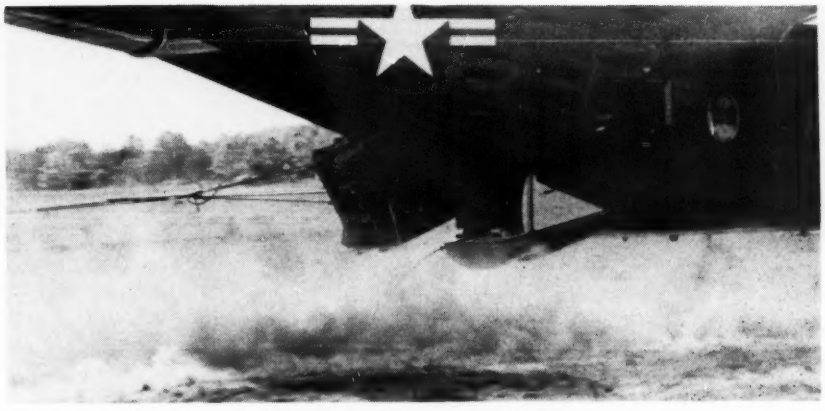
THE U. S. ARMY CV-2 Caribou made a low, steady flight up the runway. As its wheels briefly brushed the ground, a trailing hook engaged a cable. Simultaneously the aircraft began climbing and a jeep was pulled from its fuselage and settled unscratched on the runway.

This incident occurred during evaluation tests of a ground proximity cargo delivery system recently at Fort Bragg, N. C. Flying at up to 120 knots, the Caribou successfully off-loaded palletized packages weighing 3,300 pounds.



Two main components were used—a ground based rotary hydraulic energy absorber unit and a spring rail hook shank fastened to the aircraft's landing ramp. The hook (center) engages the cable and the cargo is drawn out (bottom).

The touch and go technique can be used where cleared areas are available. The low flyby (5-6 feet above the ground) method can be used anywhere an open area can be found, since the aircraft need not touch down.



Advantages of this system over the paradrop method include swifter delivery and pinpoint placement of cargo. This system was developed by the All American Engineering Company.

ASE... a Help or Hindrance?

CWO James H. McCullough and William C. McKinney

YOU'VE GOT the world's best equipment; take care of it." How many times have you read or heard this? Well, you do have the world's best equipment, and one example of this is the automatic stabilization equipment found on the CH-34C and CH-37B helicopters.

Maybe one reason we do not appreciate some of our equipment is that we don't understand it or don't know how to use it.

Let's take a look at ASE (automatic stabilization equipment). First of all, what is ASE? ASE might be termed an autopilot. I use the word "might" because ASE differs from the autopilot in fixed wing aircraft in that ASE may be engaged at all times, with the stability corrections being introduced into the flight control system in such a manner that the pilot has complete control of the helicopter through normal use of the flight controls.

ASE is designed to improve the handling characteristics of the helicopter, to permit automatic cruising flight and hands-off flight by introducing absolute static and dynamic stability. This means that, without any help from the pilot, ASE can make accurate corrections for direction, pitch, roll and altitude.

Since ASE is equipped to accomplish these feats, one may assume that you can hover with ASE. Army helicopters equipped with ASE are *not* able to hover; however, the Navy's HSS-1 helicopter (CH-34C) is equipped with a hover coupler which allows it to hover over one spot. This is quite helpful when a Navy aviator is required to hover over the water for extended periods of time; with no visual references to speak of, it makes his job a lot easier. One of the Navy's uses for the HSS-1 is to have a sonar ball suspended below the helicopter in the water for submarine detection.

So far, ASE seems to be pretty good, huh? Let's take a look at some of the negative comments made about ASE. "It's

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Now serving in Germany, Mr. McCullough was with the Dept of Maintenance, USAAVNS, when this article was written.

Mr. McKinney was with the Dept of Tactics, USAAVNS, when this article was written.

no good." "Why add the extra weight?" "It's dangerous." Maybe persons who make these statements do not understand all there is to know about ASE.

As stated previously, ASE permits hands-off flight — mighty convenient for instrument flying, I would say. When landing with a heavy load do you have trouble holding the heading of the aircraft as you start to apply power? Well, if you use ASE, it will help you hold your heading and help to make a smoother touchdown. It might be interesting to note here that ASE can correct for itself 200 times faster than the pilot can correct for himself.

"Why add the extra weight?" ASE weighs only about 70 pounds. This weight was checked on actual aircraft. This is less than the weight of 12 gallons of gas. Quite insignificant considering the job it does for the pilot.

"It's dangerous." This is quite true if you don't know how to operate ASE, but a helicopter is also dangerous if you don't know how to fly it. ASE is not really complicated and an extensive training program is not required to qualify a pilot in safe use of it. (See "Crash Sense," DIGEST, November 1961.)

TM 55-1520-202-10 and TM 55-1520-203-10 give an orientation on ASE to include its use, checks, and malfunctions. After reading either of these TMs and spending 2 to 3 hours on a practical checkout, any CH-34 or CH-37 qualified pilot should be able to understand and use ASE.

Two items mentioned in the TMs deserve clarification:

First of all, it is not necessary to center the yaw trim before starting or after engaging ASE, because the helicopter is always stabilized directionally, no matter where the trim knob is when engaging the ASE. Once ASE is engaged, turning the trim knob one index mark will turn the aircraft one degree.

The second item for clarification is that normal procedures for ASE operation found in Chapter 2 of both manuals might lead an aviator to believe that ASE should or must be engaged on the ground before takeoff. If ASE is expected to be used during the flight, ASE checks must be part of ground procedures; however, the equipment does not have to be used during takeoff and may be engaged in flight. In fact, for an aviator being introduced to ASE, we recommend the first demonstration to be in flight to avoid confusing the aviator with establishing rate of climb and climbing and landing with ASE engaged. These maneuvers should come later. [For additional operating procedures, see DIGEST, June 1960, p. 5.]

Automatic stabilization equipment is but one example of fine equipment often improperly used and, therefore, little appreciated. Only by learning the equipment and its capabilities can we exploit the maximum from our "World's Best Equipment."

1,000 Flying Hours Completed by YUH-1D

THE ARMY'S latest helicopter, the YUH-1D, has completed its 1,000 flying hour accelerated logistical test. The test accomplished in 108 flying days what would normally amount to three years' use in an operational Army unit.

The test was conducted by the U. S. Army Aviation Test Command at Fort Rucker, Ala. The purpose of the accelerated logistical test was to determine reliability, supportability, and maintainability of the aircraft in terms of manpower, spare parts, tools, and publications necessary to make the new aircraft operate effectively in Army field units. During the 1,000 hours of flying, maintenance and supply data was compiled which would have taken 3 years of normal operation to accumulate. In addition, improvements in the production model were recommended.

Basically, the YUH-1D [left, below] is an enlarged fuselage version of the UH-1B. Relocation of the fuel cells substantially increases the cabin space available. For troop movements, the YUH-1D accommodates a pilot and up to 12 fully equipped soldiers, 50 percent more than the B model. Combination of the seating arrangement and enlarged doors permits rapid entrance and exit.

Besides the YUH-1D at Fort Rucker, six other D-model Iroquois have either completed or are still undergoing additional flight and static test programs.

Hurry, send a chopper! Once this cry was associated almost solely with medical evacuation. Today it can be an urgent plea for many other types of aviation support including

Aerial Delivery of a FIRE BOMB

Major Leyburn Brockwell, Jr.

DURING WORLD WAR II and Korea the use of napalm as a fire bomb and a flame thrower fuel had tremendous impact as a casualty and psychological agent. The demoralizing effect of the fire bomb against enemy troops and fortifications proved to be very effective, causing shock and panic even where actual injuries were slight. In Korea fire bombs were more effective against deeply entrenched troops than large amounts of high explosives. Unfortunately its use against an enemy in close contact was restricted. The high speed and subsequent inaccuracies of the delivery platform seriously curtailed use where the need was the greatest.

In tests conducted last year, the Aviation Section, XVIII Airborne Corps, used the OH-13 helicopter to effectively deliver numerous locally constructed 15-gallon fire bombs weighing approximately 120 pounds.

The tests were conducted in seven phases:

- Design and manufacture of an adequate bomb rack support for the OH-13 helicopter.
- Design and installation of wiring systems for dual and single release of loads.
- Hovering and flight tests with various loads to determine flight characteristics.
- Dropping of dummy loads to determine accuracy and flight characteristics during release.
- Evaluation of M-173A1 bomb fuse and M-23A1 fire bomb ignitions.
- Design and manufacture of adequate fire bombs for helicopter delivery.
- Live delivery of fire bombs for coverage and accuracy.

The bomb rack and shackles used in this installation are the standard racks and shackles in use on all 0-1 aircraft.

Maj Brockwell is dual rated with over 2000 hours. He is currently assigned to Avn Co., 8th Infantry Div. While at XVIII Airborne Corps, Fort Bragg, N. C., he directed the development and testing of bomb rack kits for aerial delivery of napalm and other items of ordnance and supply from the OH-13. He was named Army Aviator of the Year (1961-1962) for this and other endeavors.

The bomb supports were designed to be light, easily removable, and simple in design. Sheet-galvanized steel was used to make the channel unit, but aluminum of equal strength could be substituted. One bolt on a hinged strap of each end of the cross tubes of the OH-13 bomb stabilizer was designed and proved to be more than adequate to stabilize a load placed in the shackles. Complete rigidity during steep turns at 80 knots IAS was experienced with this type of installation.

The wiring of the arming and release mechanism was designed to give independent operation, allowing release of either left or right loads or release of both simultaneously. The emergency salvo system is utilized by activating the drop circuits prior to takeoff. At any time the cyclic drop button is pressed without the arming lights on, the load will be dropped safely. The arming circuits are actuated no longer than one minute before the drop to maintain maximum safety. This action closes the arming solenoid on the arming wire, holding it securely during the drop. With all circuits closed the fire bomb will be dropped armed and the fuse activated.

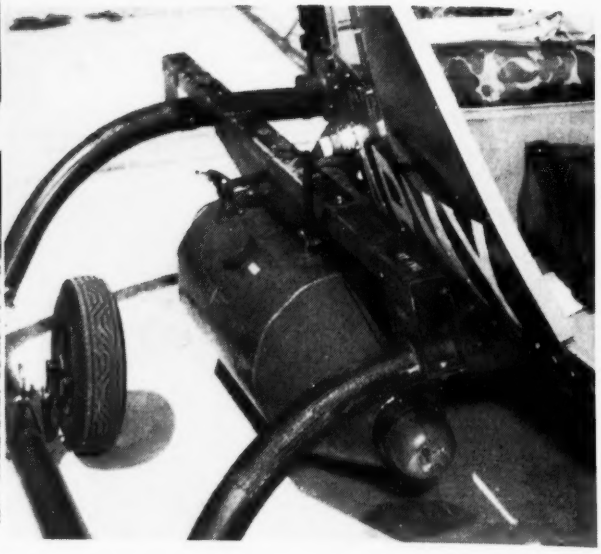
For hovering and flight checks without an observer, two dummy bombs loaded with sand to weigh 125 pounds each were used. No control difficulty was encountered and hovering was accomplished using 3100 rpm, 24 inches mp. Outside temperature was +10° C during forward flight checks. No unfamiliar control responses were found but takeoff distance was extended approximately 25 percent. Forward cruising flight could very easily be maintained at 70 knots IAS. Normal turns at 70 knots IAS were made without incident but steep turns developed buffeting and a light collective.

In the dummy drop phase the bombs were dropped to determine any adverse flight control response and to develop target accuracy before live drops. All practice approaches were made at 200 feet altitude and 70 knots IAS.

During forward flight no noticeable drag or control feedback was noticed. Release of the loads was accomplished with no sensation of lost weight or change in normal flight characteristics.

The fuse and ignition used in these tests were the standard Air Force ignitions and fuses as used on their M-1 fire bombs. The M-173A1 fuse is an impact fuse of the direct arming-vane type. It functions at any angle of impact and can be used as either a nose or tail fuse. When the fire bomb is dropped the arming wire withdraws, freeing the arming vane to rotate in the air stream. After approximately 15-20 revolutions of the arming vane the fuse is armed. The fire bomb igniter used was the M-23A1, which contains about 1¼ pounds of white phosphorus.

The design and construction of an adequate fire bomb container for the OH-13 posed many problems. To be effective the bomb must be constructed of material light enough to ensure adequate and complete rupturing upon impact and sufficiently strong to prevent the cans from buckling during steep turns. Numerous containers were acquired and tried but proved inadequate because of sealing, rupturing, size, and other undesirable characteristics. The container that proved to be most suitable, but still not ideal, is the 5-gallon aviation oil can. Three oil cans were placed on top of each other with the inside ends cut out and brazed together. Ordinary hasps brazed to the tops provided bomb supports. Heavy gauge wire was brazed to the tops and provided the fastening point for the M-23A1 fire bomb igniter.



This type of fire bomb (above, left) was the best solution using existing hardware. However, dependent upon angle of impact, complete rupturing is not always assured due to the steel construction; consequently, a decrease in the fireball coverage is suffered. The ideal fire bomb is shown above, right. It is of light aluminum and because the container weighs less, an additional 3 gallons of napalm is added. The streamline design materially assists in takeoff and in flight drag.

The fire bomb mixtures were varied to achieve the optimum. The most ideal mix was 6 percent M-1 thickener, which produced a stable gelatin. As a field expedient high detergent soap would produce almost as good a mix. All types of gasoline were used. It was found that an octane higher than 90 should not be used; the higher octane does not deteriorate as well as the lower octane.

The fireball obtained by dropping a single bomb covered an area 30 yards long by 20 yards wide. Using two fire bombs, the area was 35 yards long by 25 yards wide. The fireballs obtained a height of 100 feet, dependent upon wind and moisture content of the air. In all cases the helicopter was well clear of the impact zone of detonation.

The OH-13 helicopter in its present configuration (with minor modifications) is quite capable of being armed with two 20-gallon napalm bombs.

Use of the OH-13 in an offensive role employing napalm has the following advantages:

- Simple modification (no

Lower left, troops take cover after receiving small arms fire during an XVIII Airborne Corps demonstration at Fort Bragg, N. C. Center, an OH-13 helicopter is summoned and within minutes delivers a napalm bomb on the "enemy's" position. Right, troops charge to engage the "enemy" as napalm explodes over a wide area.

sights or specialized equipment that is not now currently available).

- Simple ordnance loads which can be fabricated at battle group level.
- Wide range of suitable targets (armor, bunkers, boats, villages, and dug-in personnel).

As to the vulnerability of the helicopter from enemy fires, it is well understood that the helicopter—like the tank or the infantryman—will be vulnerable to some extent when committed to combat. I would like to quote Lt Gen Hamilton H. Howze who sums up this question quite well: "The vulnerability of the helicopter is of course a pertinent consideration. These machines will be subjected to normal hazards of combat and it will not be unusual to see one crash and destroy its occupants. War can be dangerous, but the answer to the survival problem lies in the technique of helicopter employment with special reference to the use of supporting fire to enhance greatly the chance of survival."

Napalm is mixed in the field during tests

US ARMY, MARINES CARRY OUT FIRST COMBAT MISSION

* * *

Besides the U.S. Marine helicopter company, the 57th U.S. Army Helicopter Co., stationed in Saigon, participated.

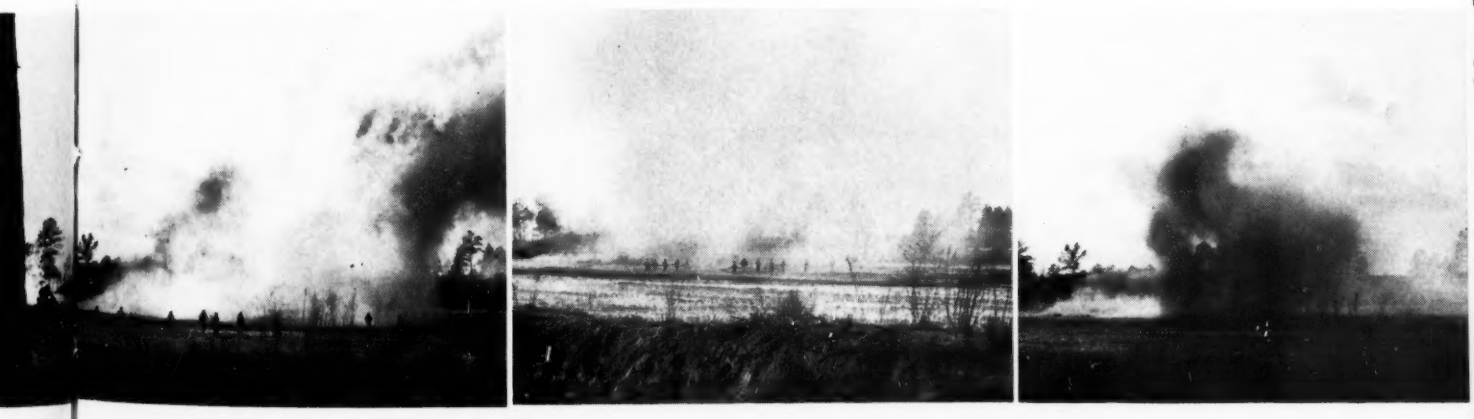
After leaving the staging area here, the big CH-21 troop carriers skimmed along to their targets along the canals at 90 miles an hour only a few feet from the ground.

As the helicopters touched down near the hamlet of Ap My Qui to unload troops, bursts of enemy fire came from the banks of an adjacent canal, raising spurts of dust near idling machines. The Viet Cong also fired on the helicopters as they passed over the junction of two canals.

No helicopter was hit. They were on the ground in the various landing zones less than three minutes. American gunners returned the Communist fire whenever their craft came under attack.

Excerpt from news story, April 23, 1962

Lower left, under cover afforded by smoke, the troops charge the "enemy." Center, as the smoke clears, the troops close with and route the "enemy." Right, objective secured! The troops pursue the "enemy" and secure the high ground in the distance. Meanwhile, the OH-13 has been reloaded with napalm and is ready to offer additional support.



PANIC POINT!

William H. Smith

AN OLD AIRLINE pilot is credited with saying, "Flying is nothing but hours and hours of boredom, punctuated with moments of stark terror." When that moment of stark terror interrupts the routine of boredom, why are some aviators able to come through, while others seem to forget the emergency procedures that have been taught them?

In an attempt to answer the question let's look at the various aspects of the problem and see if we can come up with a theory. First of all, what is fear?

Fear is an intense emotional reaction characterized by attempts to withdraw from the situation, according to the Encyclopedia Americana. The encyclopedia also explains that panics are fear reactions arising when there has been no preparation for meeting the threat.

And there we have our first clue, " . . . no preparation for meeting the threat."

Perhaps those lucky individuals who always seem to come through in an emergency are able to see and use the preparations that have been made for meeting an emergency. Or perhaps if we carry this even further, when preparations have been made to meet an emergency, is it still an emergency?

Suppose you are flying along, enjoying the scenery. The air is calm; your engine is functioning perfectly; and below you is nothing but mile after mile of pine trees. Suddenly the engine falters a little—then goes dead.

Are you now in an emergency? Apparently you are. Down below you are trees and more trees. As far as you can see there is not a patch of cleared ground big enough to land in. And here you are with no engine to pull you in to your planned destination.

Is it really an emergency? Suddenly you remember that all you have to do is pull the throttle back a little and change to a tank with fuel in it. You see, preparations had been made for just such an occurrence. Of course, it would have been an emergency if there had not been two tanks or if you had become so excited you forgot to switch. But you did remember and you did act. So, it became just a ho-hum-switch-tanks routine.

Looking into this matter of fear and emergencies a little further, we see another clue. When the engine went dead, you were able to think out the trouble and take corrective action. Thus our second clue is in the matter of thinking during an emergency.

Recently Col Earnest A. Pinson, USAF, holder of two Legion of Merit awards, a Distinguished Flying Cross, and the Soldiers Medal, was interviewed on the subject. He believes the ability to think in an emergency is a great asset in coming out unharmed.

And he is certainly qualified to speak. He seems to have the knack of getting out of tight spots. For instance, it was Colonel Pinson who, in 1956, flew in the first airplane to go through the boiling mushroom cloud of a megaton H-bomb explosion over Bikini Atoll. He came out without a scratch.

He likes to use boxing to illustrate his point.

"In boxing," he said, "you have to think even when you're hurt, or you don't last. Somebody knocks you all over the ring for two or three rounds, but if you keep your head and never admit you are licked, maybe you can win."

Mr. Leslie McFadden, instructor pilot for the AO-1 Mohawk, U. S. Army Aviation School, Fort Rucker, Ala., says, "Of course an aviator must think in an emergency. If not, he does not stand much of a chance to come out unhurt."

Mr. McFadden, who incidentally has been able to come out of many emergencies unhurt, carries the subject even further.

He says: "The aviator must know exactly what he and his equipment can do. If the aviator tries to get more out of his airplane than was built into it he is

in trouble. Therefore it is important that every pilot must have a will to learn. He must jump at the chance to learn all there is to know about the equipment that he is flying."

Mr. R. N. Hayes of the Safety Division, U. S. Army Aviation Center, says that in our study here we should consider this matter of panic a little more. He believes that when confronted with an emergency situation, each individual aviator arrives at a point where reasoning will be impaired by panic.

Mr. Hayes explains: "Some aviators with extensive experience and background have accumulated knowledge that enables them to have a higher panic point. It is known that lack of familiarity with a condition taxes the brain on taking care of details in emergencies.

"Two pilots with the same general background and experience might have a very great difference in their panic points. One pilot, who is continually thinking in terms of emergencies while flying and is mentally covering emergencies and emergency procedures, is likely to have a high panic point. This pilot will take care of many details automatically and will have a relatively free mind to make sound decisions. Constantly striving to know what to do in advance of an emergency situation also saves seconds that might mean the difference in life or death.

"On the other hand, the pilot who is not emergency conscious and who flies with little thought of coping with an emergency situation is likely to become involved in many details that should be automatic. This impairs his thinking out a problem and arriving at a sound decision."

It would seem that it all boils down to being able to think during an emergency. But you can't just stop there. You can't say to yourself, "Something's wrong. I've got to handle it in half a second before I hit the ground."

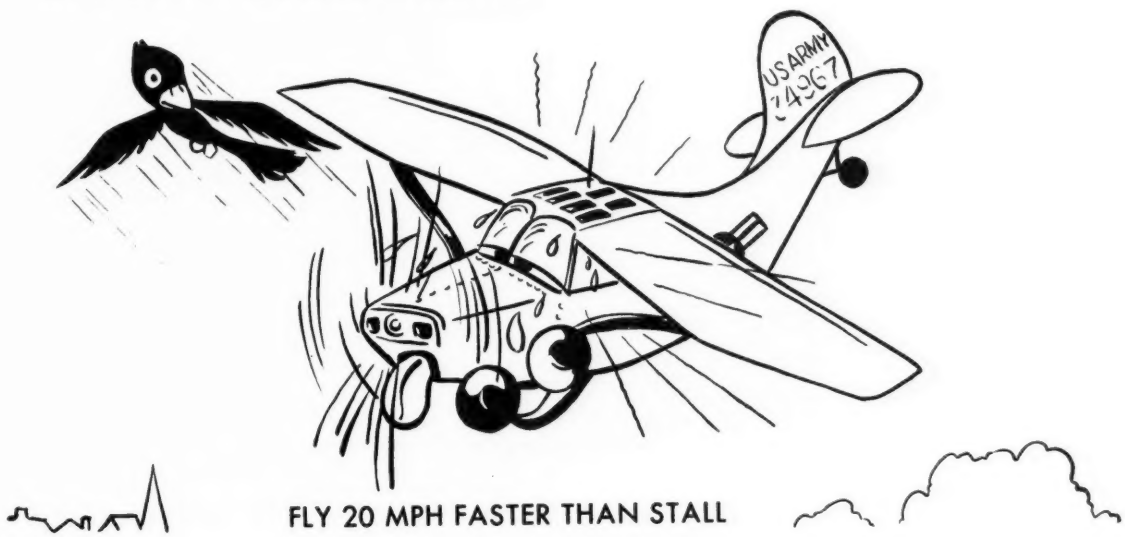
This kind of thinking is guaranteed to keep any aviator completely confused until the wheels hit the ground and the tail is motionless 15 feet in the air.

You must practice in your cockpit and/or in your mind just what you will do when the prop does stop turning. And you must know what you and your equipment can do. Then you will do the routine things automatically, and the emergency will become simply an unusual situation.

In this way if you really do have an engine failure, and your procedures do not start it again, your mind will not be cluttered with details. You can think clearly of the situation at hand and what to do about it.

Be aware that those "moments of stark terror" may come, that your hair can literally stand on end. But know also these moments are no time to give way to alarm. It is a time to make the brain keep working.

SAFETY PRECAUTIONS



FLY 20 MPH FASTER THAN STALL

prepared by
THE U. S. ARMY
BOARD FOR
AVIATION
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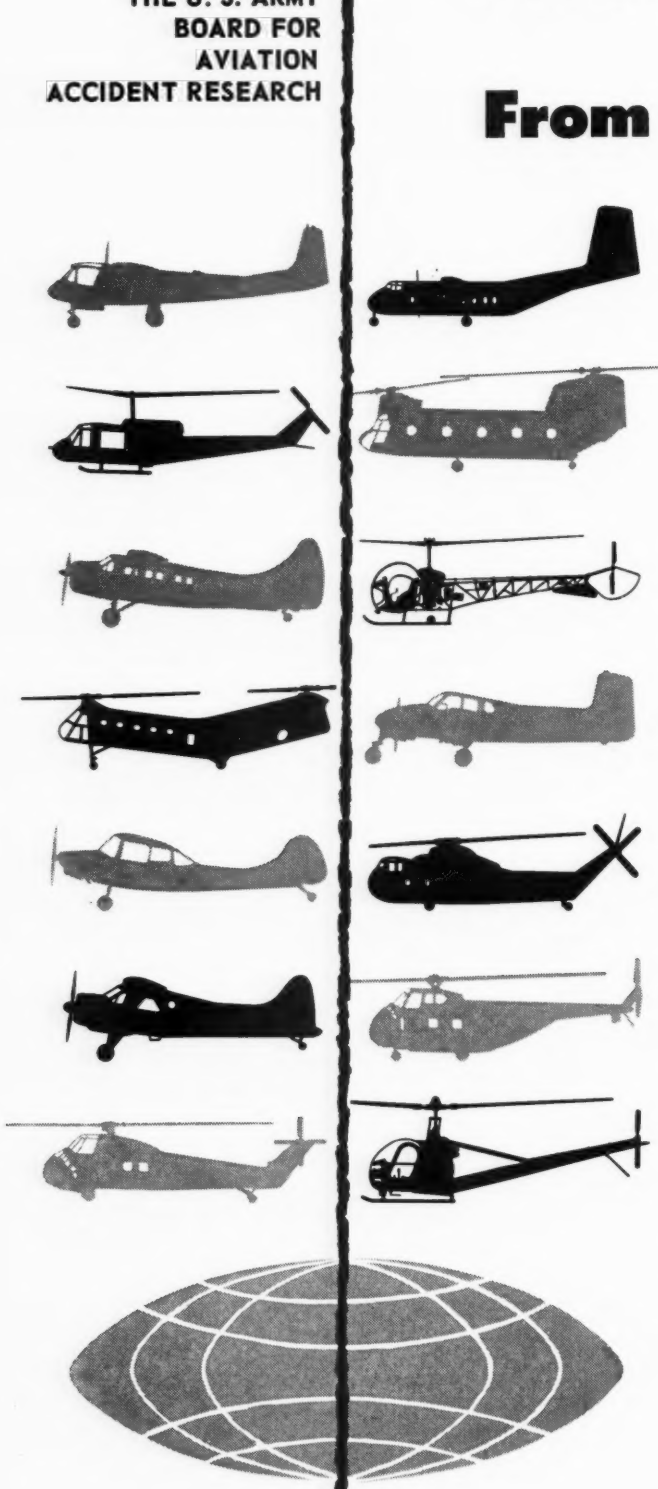
TWX EXCERPTS

From Jan. and Feb.



UH-1B ENTERED OVERCAST and pilot became disoriented. Aircraft broke out of overcast in nose-low, high airspeed altitude and crashed into hillside. Major damage to main rotor, engine, transmission deck, tail rotor, and tail cone. No injuries. Weather was 500 feet overcast, with ¾ mile visibility in light drizzle and ground fog.

UH-1B ENGINE FAILED in flight. Forced landing completed with no damage. Caused by vapor lock and fuel starvation from unsecured quick disconnect on outlet side of fuel strainer.

OH-13E ENTERED SEVERE TURBULENCE and pitched up. Pilot bottomed collective pitch during recovery and engine oversped to 4000 rpm. Forced landing completed with no further damage.

UH-19D RETREATING BLADE STALLED during attempt to dissipate excessive speed (85 knots) on final approach by cyclic climb. Aircraft went into ground resonance at touchdown. Major damage to main rotor blade, hanger bearing, tail rotor drive shaft, and transmission. No injuries.

U-1A PARTIALLY STALLED and landed hard hard during simulated engine failure after takeoff. Landing gear strut was driven through fuselage and ruptured oil tank.

U-8D NOSE GEAR LOCKED in up position and would not come down. Both main gear locked down and would not retract. Aircraft was landed on main gear, propellers were stopped, and the nose settled to the runway. Major damage to both propellers, nose gear, and nose well. Caused by installatio nof unidentified bolt in place of proper bolt (P/N AN3H144A) in nose gear retracting mechanism. Suspect maintenance and inspection factors.

OH-13H FLEW INTO FOG over deep snow, and ground contact was lost. Aircraft struck treetops and crashed in edge of wooded area. Aircraft destroyed. Pilot and passenger sustained minor injuries.

O-1A STRUCK WIRE during reconnaissance of low-level navigation training course. Minor damage to engine cowling, left wing stud, windshield, windows, antenna, and right wing. No injuries.

OH-23F FLEW INTO DOWNDRAFT while approaching ridgeline at 10,000 feet. Aircraft was turned 180° downslope, and downdraft forced it to the ground. Left skid struck unknown object, collapsing skid, and aircraft rolled on left side. Major damage to main rotor, skid assembly, tail rotor, gear box, fuel tank, and stabilizer. No injuries.

OV-1A CRASHED THROUGH FENCE during attempted go-around. Tech inspector (riding as crewman) called, "No wheels; don't land," just prior to touchdown. Pilot applied full power, retracted speed brakes, and raised flaps 15°. When airspeed reached 80 knots, pilot attempted to raise nose. Aircraft did not respond, but remained with gear just off ground and crashed through chain linge fence off end of runway. Landing gear had been checked on downwind and final. Major damage to propellers, engines, nose gear, flaps, and fuselage. No injuries.

CH-21C STRUCK TREES during forced landing approach after engine failure. Major damage to aft rotor blades. No injuries. Metal found in sump. Suspect master rod and piston failure.

CH-34C PITCHED UP and entered steep left bank in flight at 2,500 feet. Pilot recovered and completed forced landing with no damage. Suspect malfunction of left lateral primary servo.

O-1A TAXIED INTO TREE. Minor damage to right wing and top of cockpit. No injuries.

O-1E ELEVATOR FROZE in full up position during takeoff. Takeoff was aborted and aircraft stopped with no damage. Caused by binding of right elevator on right horizontal stabilizer fairing.

U-6A LOST OIL in flight. Oil was seen on windshield and around air intake five minutes after takeoff. Forced landing completed with no damage. Oil leak caused by crimping of engine oil screen gasket during installation.

U-8F STRUCK BUZZARD on downwind leg of traffic pattern. Leading edge of right wing damaged. Landing accomplished with no further damage.

CV-2B LOST OIL from No. 2 engine while aircraft was climbing to 9,000 feet IFR in clouds. Crewchief reported oil leak, and fire warning light and oil low level light came on weakly. Oil loss increased. Aircraft was given clearance to reverse course, and warning lights brightened. No. 2 engine was set at zero thrust and emergency was declared. Instrument approach and forced landing completed with no damage. Oil loss caused by leaks from eight lower rocker box gaskets. Engine lost 8.5 gallons of oil. Oil pressure and temperature gauges in normal range throughout emergency.

UH-19D NEEDLES SPLIT and engine rpm went to 3500 during night landing approach. Aircraft struck wires and crashed during attempted autorotative forced landing. Major damage to all components. Instructor pilot and pilot sustained minor injuries. Suspect clutch failure.

Rescue Operation in Iran

Lieutenant Colonel Jerome B. Feldt

The Seventh Army Aviation Training Center was alerted at 1900 hours on 30 January for a possible requirement to send one UH-1B helicopter with crew to Iran to assist in the search and recovery operation resulting from the crash of a U-1A Army aircraft in the mountains. Here's a detailed account of the operation.

The helicopter was to be airlifted by either a USAF C-130 or C-124 aircraft. Plans were made for the disassembly of the helicopter. It was determined that a C-130 aircraft was the most suitable means of transportation. The C-130 cruises at 280 knots, versus 180 knots for the C-124, and the same amount of disassembly of the helicopter would be required for transportation in either aircraft. The only special equipment required to load the UH-1B into the C-130 is a narrow set of ground handling wheels with 6-inch tires. The Transportation Maintenance Depot at Coleman Barracks supplied these. The depot was also alerted to supply repair parts for the UH-1B.

At 1000 hours the following day, the commanding officer of the Seventh Army Aviation Training Center, was called by Lt Col Lovelady of Air Rescue Service, Ramstein Air Base, and informed that there was an urgent requirement for the UH-1B and crew in Iran. It had not been possible to remove the survivors of the crash from the mountain. In addition, two Air Force rescue men were stranded on rock ledges in the mountains and were unable to move or to be moved without additional assistance. They had landed on the rock ledges by parachute while attempting to rescue the crash survivors.

The Seventh Army aviation officer was informed of the development. Instructions were given to start disassembly of the helicopter and to make firm plans to support the requirement. Approval would be required by USAREUR before actual departure to Iran.

Clearance was obtained from the transportation officer, Seventh Army to use a new UH-1B of the 29th Transportation Aircraft Maintenance Company. Field maintenance personnel were offered by the transportation officer to assist in the disassembly of the helicopter and to form part of the crew to go to Iran if necessary.

Disassembly of the helicopter was started at about 1045 hours and completed at 1445 hours. It was necessary to remove the main rotor blades, stabilizer bar, elevator, one tail rotor blade, and the complete mast and rotor head assembly. All of the removed parts with the exception of the main rotor blades were packed to prevent damage in transit.

A USAF C-130B arrived at Stuttgart Army Airfield at 1520 hours. Loading of the helicopter was begun immediately. Salvage mattresses were used to protect the main rotor blades and were placed on the floor of the C-130 to provide shock absorption for all of the loose parts and equipment. The loading was completed by 1630 hours. This time could have been decreased by 20 to 30 minutes with experienced personnel. One mechanic had previous experience loading an UH-1A into a C-130A. No unusual problems were encountered in the loading operation. Approximately 15 men are required to load the helicopter if the C-130 is not equipped with a winch. We loaded without use of the winch.

The C-130 was taxiing out for takeoff at approximately 1700 hours when one of the main landing wheel tires blew out. An immediate call to EVEREUX for another tire and two special alligator jacks was made. The C-130 bringing the tire arrived at about 2145 hours but had brought only one of the special jacks. This slowed up changing the tire considerably. After much delay we took off at 0045, 1 February, arriving at Neubiburg to pick up a 27-man German Army alpine

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Col Feldt is commandant of the Seventh Army Aviation Training Center, APO 46, N. Y.

team. We departed Neubiburg at 0300 and landed in Athens where we were delayed until 0910 by another blown tire on landing. The additional delay was disheartening but fortunately a replacement tire and jacks were readily available.

The information available to the C-130 crew regarding the airfield at Dezful, our destination, was limited to the fact that it had a runway 10,000 feet long and was used by jet fighters. We also had its location plotted on a map. We were flying at 25,000 feet after leaving Teheran over a solid overcast. We were afraid we would have to return to Teheran to use the instrument approach to land. This would have placed us 275 miles from our destination, which was undesirable.

Major Sanders, the C-130 aircraft commander, tuned to emergency frequency when we arrived at what we hoped was the vicinity of Dezful, Iran. Fortunately he was able to contact Captain Hemphill, an Army Aviator flying an U-6. Captain Hemphill was involved in the rescue operation and was able to give us the beacon frequency at Dezful and also gave us the letdown procedure via radio. Major Sanders used the procedure and we broke out of the overcast headed for the runway.

We arrived at Dezful, Iran at approximately 1745 hours local time on 1 February and found that everything was prepared for our arrival. An entire hangar had been emptied for our use. The airfield commander at Vahdahti met us and had a number of his English speaking lieutenants stay with us and assist in any way possible. Throughout our entire stay the Iranian government did everything possible to assist the operation. The aircraft was unloaded without any trouble, thanks to the special narrow ground handling wheels, and was assembled and ready for test flight at 2300 hours.

UH-1 restrained in C-130 aircraft

It is important to have a reliable lifting device to use in the assembly and disassembly of the aircraft to prevent any damage to the mast assembly. It took three mechanics approximately three hours to reassemble the helicopter. This crew consisted of two unit maintenance personnel and one field maintenance mechanic. The field maintenance mechanic is a necessity to supervise, inspect, and sign off all third and fourth echelon maintenance. Care should be taken that no dust or dirt be allowed to get into the main gear box during the time the mast is out. We covered the open top of the main gear box with a piece of cardboard that had been shaped to fit over the studs on the gear box, and this worked quite well.

During this assembly period we stopped work only to eat C rations that we had carried with us. We also had carried 12 cans of water. If at any time during our operation there was any doubt as to the quality of the local food or water we had our own supplies to fall back on. Also, because of the terrible terrain we were flying over, it was comforting to know that if we had any trouble we had a 3-day supply of rations and water with our survival gear and a PRC-6 radio (with the crystal for the rescue channel) in the baggage compartment.

At daybreak, on 2 February, we took off for Masjed-Soleiman, referred to locally and hereafter simply as MIS, a distance of 50 nautical miles. On arrival at 0745 we were briefed on the status of the operation, frequencies, call signs, etc., and what

was desired of us. We were informed that a ground party was attempting to reach the scene of the wreckage from the eastern side. (Shortly after our arrival this attempt was called off due to the extremely slow progress.) All personnel who got on the mountain either jumped or were taken by helicopter. Everyone who came off the mountain came off by helicopter.

MIS served as our primary base of operations. A base camp had been established at the 4,500-foot level about 30 miles northeast of MIS and about 18 miles west of the crash site.

We were shown the route to base camp by two pilots from Aero Contractors Ltd. who were flying Alouette helicopters for the oil companies. These two pilots had removed the two crash survivors and one Air Force paramedic from the crash site. They had also flown in two U. S. Army medics and two Iranian alpinists to assist in saving the second paramedic, who had been blown over the side of the mountain. He was in an extremely precarious position for 52 hours on an isolated pinnacle with sheer sides. Looking back on the whole operation, we can see just what a fine job these two pilots did. Operating at the 12,500-foot level, the Alouettes had almost no reserve power left to c o m b a t the ever-present downdrafts and turbulence.

At the base camp we discussed the approaches and departures to and from the mountain with these pilots, and obtained a pretty good idea of what the helipad area was like. After looking at the clouds that were in and around the mountain, these two pilots were of the opinion that the wind was blowing too hard to go up right away. We waited a short while, but because of the increasing necessity to get the personnel off the mountain we decided to make an attempt to get up there.

During the 18-mile trip from base camp (altitude 4,500 feet) to the helipad on the mountain (altitude 11,800 feet), an Army U-6 provided radio relay between us and the two Alouettes. Both the U-6 and the Alouettes were equipped with HF. The U-6 would then communicate with us over FM or VHF.

The trip from base camp to the mountain is over some of the most awesome terrain imaginable. It's hard to imagine flying 18 miles without seeing a single spot where a helicopter could land. The land rises straight up on one side and slopes steeply down on the other side until it meets another sheer rock wall and steep slope. The terrain continues this way from base camp 20 miles in either direction along our flight path and north and south as far as the eye can see.

It was only a 40-minute trip from the mountain to MIS; yet, the local tribesmen and residents estimated that it would take a person 32 days to walk from the foot of the mountain back to MIS. We figured that in the event of a forced landing our best chance of survival would be with the native herdsmen.

On approaching the mountain, we saw that the landing site was located in the back of a half-moon shaped canyon. The peaks rose up on both sides and the back disappeared in the clouds that were hanging at the 13,000-foot level. We circled outside the canyon while one of the Alouettes went into the opening in the canyon wall, turned around inside and landed (in what we discovered shortly thereafter was a small bowl-shaped valley about 200 yards in diameter). The bottom of the valley was estimated to be about 60 yards below the level of the rim we were landing on. He took off shortly with one Iranian rescuer and started back to MIS. He relayed to us through the U-6 that he thought the wind was too strong for any further attempts.

We weighed this with the fact that some of the other rescuers might perish if they spent another night up there, where the temperature was reported to go down to −35° F. We decided to try an approach. On passing over the landing site at about 500 feet (12,300 feet) and starting to turn inside the bowl, the first thing we noticed was the complete lack of visual references anywhere except on the very edge of the ridge we were to

A 7th Army UH-1B helicopter warms up before rescue operations in the precipitous and nearly inaccessible mountains of Iran

land on. We were using 6600 rpm and made an approach to the landing site without trouble except for depth perception, which was greatly hampered by the complete whiteness of the inside of this bowl. The landing site was actually nothing more than placing the front of the skids on some projecting rocks and the back on the snow that had drifted behind the rocks. Even though this did not meet the requirements for a helipad as defined by USAREUR Cir 95-5, we will refer to it as a helipad as it was the only place available.

We were on a slight upward slope. The aircraft could not be fully lowered onto the snow as the aft portion of the skids broke through the light crust and the helicopter would start to tilt backwards. A little collective pitch and forward cyclic was required to keep the aircraft level. We didn't know until afterwards that the tail rotor was in the snow about 6 inches. We made two more trips to the helipad that day and succeeded in taking out five people and at the same time brought in 4 more Iranian alpinists and an American Army Aviator (Capt Molenelli) to continue in the search for the bodies of the victims.

On 3 February the weather was so bad that even a trip to base camp was out of the question until very late in the afternoon. At that time we managed to sneak around and under the clouds and reached base camp, which was almost completely weathered in. After unloading and determining that a trip to the mountain was completely out, we returned to MIS and spent the remainder of the daylight hours installing wooden planks 9 inches wide, 3 inches thick, and 8 feet 2 inches long under each skid in an attempt to provide flotation to help prevent settling in the snow again. (These skids very soon proved to be the difference between success and failure.)

On 4 February contact was made with the personnel on the mountain, using PRC-6 radios. They informed us that approximately 6 feet of snow had fallen and it had taken them an hour and a half to dig out of their tent that morning and the winds were blowing 20-40 knots. At 1100 hours the search party was only halfway up to the crashed aircraft and visibility was only 10-20 feet in fog and mist. At 1300 contact was made and the searchers were back in their tents; further attempts were impossible due to the weather conditions. The remainder of the day was spent in ferrying members of the German alpine team to base camp.

On 5 February the weather was so bad that it was 1300 before we could get to base camp. No contact could be made and we departed base camp at 1615 hours, hoping everyone on the mountain was in good shape.

At 0840 hours on the 6th we landed at base camp hoping for a break in the weather. We had contact with the search party at 0908 and they reported that a fresh 10 feet of snow had fallen. We were loaded with three of the German alpinists and were preparing to take off for the mountain at 0930 when the search party radioed us not to come yet because the winds on the helipad were estimated to be at least 40 knots. Since this information was coming directly from our intended landing site and was being given by an Army Aviator, this was the most reliable information we could obtain. At 1000 hours contact was again established and this time the wind report was favorable, so we departed base camp for the mountain with the three alpinists and their equipment. Our approach and landing was uneventful.

Since this was the first landing in the snow with our "snowshoes" on the skids, we were anxious to see if they were the answer. They worked better than we had imagined. The helicopter didn't go down in the snow over the 3-inch depth of the planks and we were able to lower the collective pitch to the full down position.

At this time the German alpinists unloaded and assisted in loading five Iranians and some of their equipment. Although we were at 11,800 feet and had approximately 900 lbs of fuel, we decided to try to remove these five people because of their weakened condition and the fact that we might not get another chance this day. Using 6600 rpm and only 23 inches of torque we easily climbed 500 fpm into the face of 20-30 knot winds. I might add here that even though some of the local Iranian papers erroneously referred to the UH-1B as a *special high altitude helicopter,* they were right in reporting that the aircraft performed beautifully all the way from sea level right up to as high as we needed to go, 13,000 feet. We landed at base camp and unloaded our passengers, who were to be transported back to MIS by the two Alouettes.

We loaded four more German alpinists and departed for the mountain. During the trip to the mountain we were again in radio contact with Captain Molenelli on the helipad through our FM and his PRC-6 radio. He informed us that there had been no change in the wind. Again, upon entering the bowl we initiated a 180° left turn to final,

and upon rolling out, the helicopter was caught in a severe downdraft. Even with 6600 rpm and full pitch we were forced down into the bowl some 40 yards short of and below our intended landing site.

Here is where I am sure that our wooden snowshoes proved to be the difference between success and failure. The front of the planks caught in the snow enough to stop our descent. There was no damage, however. The main rotor blades were hitting the loose snow in front of us. Engine rpm had decreased to 5800. Normal rpm of 6400 was regained immediately after touchdown. We were then able to hover in ground effect with no difficulty. The airspeed indicator was indicating winds of 20 knots gusting to 30 knots while we were unloading the German alpinists and loading the remaining Iranian and Captain Molenelli. We returned to MIS to unload our passengers and refuel.

Shortly after refueling we loaded more German alpinists to be transported to the base camp and departed. Upon arrival at base camp we were informed that the German party on the mountain was requesting some additional equipment and four more men. We decided that since we had only 600 lbs of fuel on board that we would take only two alpinists in an attempt to lighten the load, thereby giving us a little more power with which to combat the possible downdraft.

In trying to ascertain the wind direction and velocity, all we could get from the search party was that they didn't think there had been much change. We contacted the assisting Air Force C-54 that was over the mountain and with the use of their drift meter they gave us the winds at 13,000 feet as 250° 30-40 knots. This was helpful but could not replace the reports that we had been getting from Captain Molenelli while he was on the hill. Because of the shape of the canyon and the small opening that we had to fly through, there was in effect a perfect venturi for the prevailing winds to accelerate through. The wind report from the C-54 could not in any way depict the existing winds that were blowing across our helipad.

Weighing all this information, we decided to take just the two alpinists and to make another trip, if necessary, to provide the German alpinists with the complete team needed in the search for the bodies. In our approach this time we decided that making a right 180° turn would also provide us with a little more power. After entering the bowl we made a right turn and rolled out on final, still indicating 50 knots airspeed.

Everything looked real fine until again we were caught in severe downdraft and forced down into the bowl about 25 yards short of and below the helipad. There was not enough power to maintain complete directional control. We ended up with about a 15° - 20° angle to the right. But, as before, the snowshoes sustained the aircraft and again prevented us from going down into the snow far enough to damage it. Again we were apparently out of the downdraft when on the ground and we were able to hover up to the helipad. The airspeed indicator was reading essentially the same as before (20-30 knots). The copilot got out of the aircraft and, from a point clear of the rotor downwash, estimated the winds to be blowing 50-60 knots, since he was having considerable difficulty in remaining on his feet.

We informed the commander of the alpine team that we could not make any more trips that day. They had rations and provisions to last the nine-man team 15 days, and he indicated that the other two men were not necessary. We returned to MIS and spent the remainder of the afternoon tracking the main rotor blades and in catching up on some of the inspections due on the helicopter.

On the 7th we ferried three more German alpinists to base camp and made contact with the search party at 1400 hours. They informed us that they were forced to stay in their tents because of the winds, rain, and snow. At 1500 hours we contacted them again and informed them we were returning to MIS as the weather at base camp was closing down fast.

On the morning of the 8th was the worst weather yet. We could not do a thing until 1300 when the weather had lifted enough to fly locally. About 1310 a message was received from the mountain that the weather made any search impossible and that the danger of snowslides was increasing. Not long after this, a message was received from Teheran to terminate the search and to get the German alpinists off as soon as possible.

In the late afternoon the weather at MIS was much better, so we took off directly to the mountain in hopes the clouds being reported by the C-54 would lift long enough for us to get in. We circled the canyon mouth for an hour and a half and we could see why the clouds were apparently not moving. The wind blowing from across the Gulf of Persia was picking up enough moisture and heat that it was being mechanically lifted up the slope of this one mountain range; it was con-

tinually forming clouds at about the 9,000-foot level. At about 1720 hours our fuel was getting low and clouds were still forming, so we informed the search party we were returning to MIS. While we were circling, the search party requested dry sleeping bags. An Air Force C-130 had been circling overhead with the bags, waiting for a chance to drop them. Shortly after we departed for MIS the C-130 returned to Dezful as it was evident that further waiting was useless.

On the 9th the weather was clear and the winds were estimated to be 20-25 knots. At 0745 hours we departed MIS directly for the mountain and removed three of the alpinists to base camp. We made two more quick trips to the mountain and succeeded in removing the remaining six members and equipment (minus a lot of equipment, including two wall tents that had been buried). We then spent the remainder of the morning and the early afternoon moving the personnel and equipment from base camp back to MIS. After clearing up base camp and loading our own crew and equipment we left MIS for Dezful, arriving there about 1645.

Again we had everything that could be provided to help in the disassembly of the helicopter. Here, I believe we established some sort of a record. It took three good mechanics only 1 hour and 30 minutes to complete the disassembly (4½ manhours). Since the C-130 had left for Teheran with an OH-23 that had arrived on the 7th and had assisted us in moving people from base camp to MIS, we stopped for supper. We had no trouble getting to sleep since we had flown 6 hours and 15 minutes that day.

On the 10th the UH-1B was loaded, ready to go an hour after the C-130 arrived. We loaded the alpine team and our own personnel and departed Dezful for Teheran. After filing the necessary flight plan and clearance papers, we departed Teheran at 1345 hours for Athens, Greece for refueling and a crew rest for the C-130.

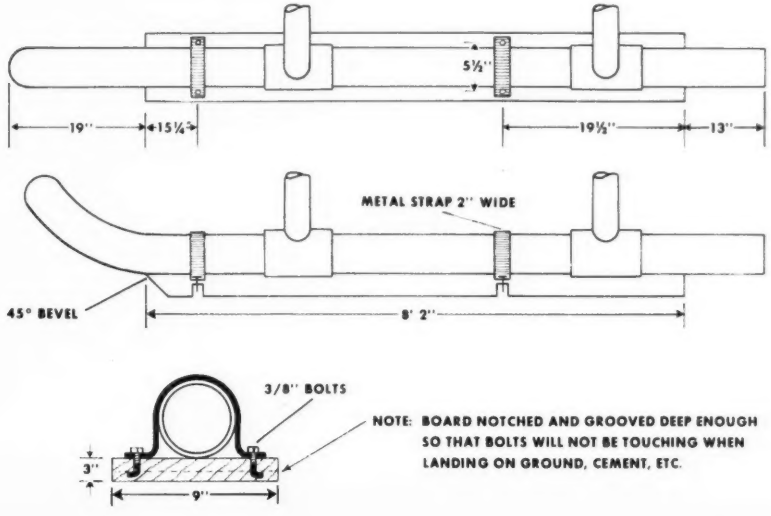
On the 11th (Athens' time) we departed for Stuttgart via Ramstein and Neubiburg, arriving at Stuttgart at 1730 hours.

Some recommendations for any future operation of this nature are:

- Allow a minimum of 2 hours leadtime in the disassembly of the UH-1B prior to the arrival of the transport.
- That a sufficient number of the special ground handling wheels be manufactured to assure availability.
- That the maintenance support activity maintain a supply of salvage mattresses, since these were invaluable for protecting the removed components in transit.
- That the crew consist of a minimum of two pilots, two organizational mechanics, and one field maintenance mechanic.
- That enough rations and water be taken for the crew to subsist for a minimum of one week.
- That a ranger-qualified Army Aviator be taken to remain with the ground party, and that he have two PRC-10 radios for communication with the aircraft in the area.
- If the UH-1B is going to be landed in snow or soft terrain, that planks 3″ × 9″ × 8′ 2″ be taken for installation on the skids. Also that a brace and bit and a good supply of long bolts be taken to secure the planks on the skids (see figure).

No fuel problems were encountered. The JP-4 fuel available was at Dezful, some 50 nautical miles from MIS. It was available only in a limited sense, as the Iranian Air Base did not have a spare tanker they could let us have. They offered to wash out some oil barrels and fill them with JP-4 and send them over. We decided against this, as we had been using JP-1 since our arrival at MIS, and continued using JP-1 until we left. We observed no unusual reaction to this fuel throughout the operation.

Total flying hours on the UH-1B were 26:15. The aircraft is ideally suited for an operation of this type. With the exception of weather phenomena as evidenced by the severe downdrafts, more than enough power was available. No unusual maintenance problems were encountered.



Russian Use of
The Air OP in WW II

Translated for the Command and General Staff School, Fort Leavenworth, Kan., from a Russian article by Lt Col N. A. Kochnovskii in VESTNIK VOZDUSHNOVO FLOTA (The Air Force Journal) No. 10, May 1943.

AT THE HEIGHT of an artillery attack, the enemy as a rule keeps up a passive return fire. However, when the offensive is supported by infantry, the enemy firing positions come alive. The reduction of these positions can be best achieved by using long range artillery, the fire of which is adjusted by observation planes. This is the period of the most intense activity of the fire adjustment aircraft.

In the battles on the Leningrad front, particularly during the breaking of the blockade, both sides employed a great number of artillery and mortar batteries. During this operation, when our artillery conducted its offensive, the artillery commander needed only a single fire adjustment plane over the battlefield to locate a small number of active enemy batteries. Furthermore, our artillery directed its fire against enemy firing positions which had been previously located and plotted.

As a rule, the artillery commander acquaints, in advance, the commander of the artillery observation air unit with the general situation, tells the time of the beginning and end of the artillery offensive, and sets the time when intensive work of the artillery observation planes will be required. The plane crews are assigned to artillery regiments and get instructions from the commanders concerning the method of firing, passwords, and so on.

The mission of our unit was to maintain contact with several artillery regiments, and the crews operating in the air were instructed to call for fire on the active enemy batteries. The order "Fire" was given to that regiment on whose sector the enemy battery was firing.

At the time when our artillery preparation came to an end and the advance of our infantry units began, the greatest number of our artillery observation planes were in the air. Particularly during this period of the operation, the coordination between artillery and observation planes helped our infantry to advance against a relatively weaker fire resistance by the enemy. A number of enemy batteries were silenced, and some of them destroyed.

Battle experience on our front shows that fire adjustment is sufficiently effective when one plane is allotted to several regiments. The plan of liaison with artillery regiments is exceedingly simple and convenient to employ. Four to five regiments are located on a certain sector of the front. Each one has its call sign and a definite area in which it operates. An observation plane

is on patrol in the air and calls for fire to that regiment on whose sector an operating enemy battery has been discovered.

All the artillery regiments have their radio stations set for reception. The observation plane can call them at any moment and direct their fire against an enemy battery which has resumed firing. As a rule, the directives given by the planes are not coded. Their coding would consume too much time. Only target designations are given in coded coordinates.

Contact between the air unit and the artillery commander is maintained by telephone. The same messages are also transmitted by radio. When necessary, the commander or the chief of staff of the air observation unit is called to the artillery unit for instructions. In addition to the telephone, it is also absolutely necessary that the command post be equipped with a radio station. Thus, the commander, upon receiving new instructions, transmits them instantly to the crews operating in the air. It is advisable to equip the radio set with a loudspeaker.

The adjustment of artillery fire may be accomplished in different ways, from a plane flying over its own territory or from one flying over enemy territory. The use of either method depends upon prevailing conditions. When the enemy has at his disposal a strong antiaircraft defense and maintains a constant fighter patrol over the objective, then fire adjustment is made from our territory. Fire adjustment depends, among other things, on good visibility.

The best way for observing the burst of our shells is to give the command "Fire" when the plane is half-way to the target. But this method should not be used blindly, without considering the situation in the air, the kind of guns the enemy is using, their distance, and finally, the speed of the observation plane itself. Experienced observer crews themselves choose the most appropriate method when they are in the air.

During counterbattery exchange, which is quite common on our front, the time of takeoff of a plane on an assigned mission is never known in advance. The plane crew is on duty on the ground and takes off immediately upon receiving instructions (by telephone or radio). In this case, the crew receives only the call sign of the unit with which it has to cooperate and the location of the sector where the enemy batteries are active. The crew must, therefore, know perfectly the region and the target numbers against which our fire is directed.

Upon receiving the order to send an observation plane, the commander of the air observation unit should provide the plane with a fighter escort. Experience suggests that the commander of the air observation unit should have his own fighter planes. When the fighters have to be drawn from another unit, the conference with the commander of the fighter unit and the organization of the meeting place for the fighters with the observation plane consume, under most favorable conditions, 30 to 40 minutes.

It is sufficient to say that an air observation unit having its own fighter escort can conduct three flights a day (in winter) without too much difficulty. However, when the fighters have to be drawn from another unit, only one or two flights a day can be made. When there is a great amount of enemy aircraft on the front, the fighter protection should be particularly effective (four to six fighters for each observation plane).

Night adjustment of artillery fire is a new field. It is not covered by regulations and was not practiced in peacetime. Fire adjustment on a bright night, when the visibility is good and when the sector has landmarks for reference points (highways, railroads, rivers, populated places, etc.), does not differ from fire adjustment by daylight. Illuminated reference points can always be found, particularly after an artillery preparation. While the crew making daytime flights may only familiarize itself generally with the sector, in flying at night it must know by heart the sector and the coordinates of enemy batteries previously plotted.

Many examples illustrate the practicability of adjustment of artillery fire at night and the necessity for perfecting it further. Thus, at the time when the blockade was being broken, during a single night flight, Pilot 2d Lieutenant Petrov and Navigator Lieutenant Gilin found two enemy batteries whose fire had been particularly active, and as a result these were silenced. Altogether, during this operation, up to 12 enemy batteries were silenced with the help of night adjustment of artillery fire.

Night adjustment also has other characteristics. While in daytime we can conduct a reconnaissance and locate the artillery positions of the enemy by certain indications, we cannot do so at night. An enemy battery can be detected at night only during firing. Night crews should thoroughly study the entire region, be perfectly familiar with the most minute details of operation of a radio station, and know by heart previously plotted locations of enemy batteries.

crash sense

PREPARED BY THE U. S. ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

The Other 1%

AT A MODEST estimate, 99 percent of all writing about aviation safety is confined to equipment and human errors by people who direct, operate, or maintain equipment. Rarely do we read anything about the most complex and mysterious part of aviation—the individual between the earphones. Yet, this other 1 percent contains the only answers to the elusive "Why?" for many accidents attributed to what we call human error.

Motivated by an outstanding report from an Army flight surgeon, this month CRASH SENSE will attempt to unscramble some of the known facts and educated guesses about the many miles of gray circuitry that govern our actions and reactions. Since no useful purpose could be served by describing the particular accident which prompted the flight surgeon's fine report, both he and the accident will remain completely anonymous. But a portion of the knowledge and several of the recommendations from his analysis are included in this writing.

Elsewhere in this issue is an article about clear writing and readability. After studying available references about the brain and psyche, it becomes painfully clear these learned authors did not have the average reader in mind when they began opening skulls, studying human behavior patterns, and jotting down their findings. They appear to have invented a language all their own. If a six syllable English word wasn't handy to describe what they wanted to say, they dusted off some unused Latin and Greek words, stuck them together, and invented a new one. It's said the professional brotherhood bands together in anguish and snorts when an outsider attempts to reduce their scientific jargon to simple terms. At the risk of arousing their ire, here's what we learned . . . .

MORE THAN A COMPUTER

The mass of nerve tissue we know as the brain has been compared, with some accuracy, to modern high speed computers. Both can store facts and release them on demand. The machine is activated by electricity and the brain emits electrical impulses which can be measured. But here the analogy starts to break down. The computer is limited by its construction and the amount of information fed into it, while the brain appears to have an almost unlimited capacity. And the computer must be mechanically stimulated, while the brain can be stimulated by any of our five senses, a basic drive such as hunger, or a thought.

THREE IN ONE

To make their thoughts clear, headshrinkers regard the mental apparatus as an instrument made up of separate and distinct parts. A part of their job is to find the points in this instrument in which our various mental processes take place. According to their most recent views, the apparatus is made up of three parts:

1. *Id*—A storage place for instinctive impulses. We are completely unaware of the processes that take place here.
2. *Ego*—This is our conscious world as we know it. The ego develops from the id, allows us to experience the external world through our senses, and consciously controls the impulses of the id.
3. *Superego*—Here's a part we'd cheerfully part with at times, conscience. Except when we overrule it, the superego dominates the ego and unconsciously controls the impulses of the id.

The couch-keepers hasten to add that these views are subject to constant alteration as new knowledge is gained.

WHAT WE ARE

Whoever said we are the sum total of our experiences was only partly right. While experience plays a large role in our development, we come equipped with certain basic drives—pleasure-seeking, pain-avoiding body needs—which must be considered.

Factors which mold our personalities include family, society, religion, economy, and education. The most significant features of this environment are other human beings. It is through other people that we satisfy most of our needs. This is affected by the sentiments and attitudes we develop from environment and experience. These become as much a part of us as the tools and skills of our occupations. And the organized system of our attitudes is what makes our individual personalities.

ADAPTING TO SURROUNDINGS

All of us are immature in certain ways. Everyone is still at times a little boy or little girl seeking to find the satisfaction denied childhood wishes, and failing to maturely adapt to all conflicts.

Adapting to our surroundings is largely a process of resolving various conflicts. These conflicts are caused by stresses. There are the social conflicts in which we must adapt strong impulses of our own to those of other people. There are conflicts between the need to be dependent and independent, to be dominant and submissive, and those resulting from love and hate of the same person. There is conflict between the need for various forms of pleasure and moral feelings.

There is also a censorship force or escape mechanism in our minds which gives us a way out of unpleasant situations or conflict. According to the white coats, this may take the form of . . .

Repression, in which we banish distasteful ideas from our minds or prevent instinctive drives from becoming conscious thoughts or action. When we repress such a drive, its energy must find an outlet, so we disguise it into something more acceptable. The instinctive drive aroused by the sight of a well filled bathing suit is disguised and comes out as a socially acceptable whistle. If your wife is near, may we hasten to recommend a more silent outlet. We can escape ideas by . . .

Displacement, in which the object of a repressed idea is replaced by another object that won't be rejected by our ego or superego.

Symbolization, in which the object is replaced by another which is similar to it.

Projection, in which repressed drives are seen as belonging to other people.

Isolation, in which the repressed idea is removed from its context.

Undoing, in which the unpleasant idea is regarded as being nonexistent or never having occurred.

Conversion, in which emotional drives are changed into physical symptoms such as paralysis or uncontrollable tics.

Condensation, in which a number of repressed ideas are concentrated in the unconscious mind into a single idea or dream symbol.

There are other ways of escape, but these will serve to illustrate the point. The disguise of repressed drives and ideas in such forms is a characteristic of the mental life of every individual, according to Sigmund Freud, who started this whole business.

EMOTIONS

An emotion is a departure from our normal calm (who says!?) state which induces feeling, an impulse toward open action, and certain internal physical reactions. It may describe fear, anger, disgust, grief, joy, surprise, yearning, etc.

Today's fast pace of life subjects us to far more emotional stimulants of stress. Ever-increasing speed in transportation and communications, technological advances, and the need to conform to higher and higher standards of living keep us in an aroused emotional state.

Emotions affect our physical and mental abilities. The stronger the emotion, the more violent the reaction. In the grip of a strong emotion, the physiological functions of our bodies, including even blood chemistry, change. Internal glands spring to action and tone our hearts, lungs, and muscles to their highest peak of efficiency as a result of adrenalin pumping into our bloodstreams. When this happens, we can run faster, hit harder, and feel less pain. Our blood will coagulate faster if we are angry. But we gain these advantages at the cost of effective mental activities. As our bodies funnel their resources to peak physical abilities, our minds are dulled by a starvation diet. When our emotions are aroused, our ability to think clearly is impaired.

FRUSTRATION

Social contacts of groups of people call forth some of the most subtle and delicate adjustments. Every person wants to gain the approval of the group, to have his merit recognized, and to feel that he has achieved something. These needs are as important in human life as the simpler physiological demands for food and warmth. When they are frustrated, the individual is not in balance with his social environment and adjustive activity is called for.

Frustration takes many forms. Two are material frustration and social frustration. Most people are able to make constructive adjustments to material frustrations, either solving their difficulties or giving up the attempt with no undue show of emotions. But social frustration is very likely to evoke emotional behavior and result in less successful adjustment.

One of the subtle types of social frustration arises when a strong immediate motive is thwarted by an individual's social habits and values. How much frustration will be represented by any given situation depends to a large extent on the strength of the motives of the individual concerned. If a person has always had his difficulties smoothed by others, and if he is always praised, he may develop an exaggerated motive for superiority and mastery. Any minor obstruction to this motivation then calls for excessively intense adjustive behavior.

Even so, most of us are able to resolve this type of frustration by satisfactory adjustments. These are usually unspectacular and go unnoticed in the course of everyday life.

But some cannot adjust in this satisfactory and unheralded way. This kind of person, frustrated in his attempts to secure esteem and prestige in a social group, will probably adjust by going into a state of depression, or by "showing off."

Boiling this psychological jargon down to its simplest terms, we find that all of us want the approval and praise of whatever group we happen to be a part. This is motivation.

IMPULSE

Why all this yak about emotions? Because emotions are a driving force that can cause impulsive actions.

An aviator flying a new high performance aircraft is a member of a select group and enjoys

tremendous prestige. As new aviators join this group, the prestige of the group is spread thinner and thinner. The pilot's position as a member of a select group is threatened. He feels a strong need to retain prestige. What better way can he find than to put on an impromptu demonstration before an audience? Emotional frustration leads to impulsive action, and a board of officers is appointed to investigate the results.

Or take the case of an aviator who is suddenly and unexpectedly called away to a remote camp. Separated from his family and surrounded by a totally male environment, he feels, *perhaps unconsciously,* that his masculinity is threatened. Seeking to be a part of the group and to assert his masculinity (a perfectly normal reaction), he drinks more than he normally would.

Alcohol soothes the forbidding, cautionary voice of his conscience (also a normal reaction) and produces a mild disintegration of his usual personality. Emotionally aroused, unconsciously seeking reassurance of his manhood, he gives in to impulse and invites his comrades to fly with him to the nearest town to seek female company. An emotional drive, a dulled conscience, an impulsive act—the ingredients of disaster.

CRASH SENSE has often beat its drums about another type of emotional stress—*get-home-itis.* Highly experienced aviators have been known to ignore thunderstorms, icing from the ground to 20,000 feet, and other equally dangerous hazards when this type of stress, a conflict between desire and judgment, leads to the impulse that starts them on their way.

Every aviator faces these and other types of emotional stress, frustration, and mental conflict. How he reacts may well determine whether they develop into impulsive actions, clouded judgments, and other accident cause factors.

PREVENTION

It's all well and good to talk about what we are and how and why we react to varying situations. But how can this knowledge be put to use in accident prevention?

The first and most important step is to recognize your limitations as a member of the human race and admit that you, like everyone else, are subject to nature's drives, frustrations, emotions, and impulses. Only after you take this step can you develop the necessary **mental hygiene.** Whether you're an aviator, a mechanic, a tower operator, or what-have-you, aviation demands your undivided attention, your ego, and your superego. Though you can't escape drives, mental conflict, and other human traits, **you can resolve them or set them aside before you go on duty.** If you find yourself unable to do this, it's time to seek help.

We've seen what can happen when emotions invade the cockpit. The same factors are no less deadly when they cause the distraction that results in a missing cotter key or contaminants in fuel storage tanks and delivery trucks.

Thanks to the flight surgeon's report, here are some concrete recommendations:

- *Careful selection of flying candidates from the psychiatric standpoint to avoid those individuals who decompensate under strees is of paramount importance.*
- *Military commanders with fliers under their jurisdiction must take an interest in the problems of flight and in the problems of fliers before accidents happen. Aviation officers and aviation medical officers should be used fully in their advisory capacities. This is particularly important in times of stress.*

• *Health records should be available on all aviation personnel, regardless of unexpected dislocations.*

• *An active aviation safety program with full medical participation is essential to accident prevention. A portion of each safety meeting should be devoted to medical problems associated with flying.*

• *Flight surgeons or aviation medical officers should be used as specified in tables of organization and technical bulletins. Aviation duties must be accorded the highest priority.*

• *In times of unusual stress, there must be in authority, administrative officers responsible directly to the unit commander for the authorization of flights.*

• *Circumstances surrounding accidents that illustrate these points should be made public in an anonymous fashion.*

This we were happy to do.

WHY NOT GROUND DUTY?

GROUND DUTY! Most Army Aviators avoid using the expression. Let's quit fighting it. Sure there are some problems to be worked out. Everyone will agree on this, but Army Aviators can serve the aviation program on ground duty, too. A remark often heard from Army Aviators is: "The Army will never integrate us into their system of thinking."

We, the ground duty aviators of the 8th Infantry Division think otherwise. Rather than their integrating us into their system of thinking, we have infiltrated among their ranks and hope we have helped influence them in thinking about better use of Army Aviation. This is proved by the fact that our division conducts heliborne operations and use of the division organic aircraft in every phase of its training that it can.

On the last Battle Group ATT we incorporated the majority of the 7th Army helicopter lift capability in moving a battle group with equipment from its assembly area to a line of contact some 40 air miles over Germany. We believe that we do not have to be in a Category I flying assignment to give aviation support to our division, but can be of real support and sell aviation in our present assignments. Maybe if more aviators would take this outlook, aviation and the different branches would have a better appreciation of each other's views.

—Submitted by Aviators of Hqs, 8th Inf Div

MEMORANDUM FOR:

AVIATORS,
FLIGHT CREWS,
MECHANICS

SUBJECT:

Bird Nests

1. Bird nest building time is here again. Much activity has been noted in the South and is moving northward with spring weather. This year the birds seem to have speeded up their construction methods. Nests have been found completed and ready for eggs in only 5 days after being started.

2. All personnel are warned to preflight aircraft very carefully during the spring months to ensure that no bird nests have been built since the aircraft was last flown.

Editor-in-Chief

First Flight of Hiller OH-5A

The first flight of the U. S. Army's sleek, turbine-powered OH-5A Light Observation Helicopter occurred on January 26. The test pilot stated that the helicopter had excellent handling characteristics and the lowest vibration levels he'd ever experienced in a helicopter.

Five OH-5A prototypes are now in production, aimed at Army evaluation early in 1964 in competition for one of history's largest aircraft production programs in peacetime. [See DIGEST, July 61.]

Beginning a new generation of Hiller helicopters, the OH-5A is powered by the Allison T63 gas turbine engine. Speeds will be over 50 percent higher than present Army light helicopters.

The OH-5A is fitted with an automatically stabilized rotor system identical in concept to that now being produced for the Hiller L-4 piston-powered helicopter.

Ready for Cold Weather User Tests

A YUH-1D Iroquois has completed the Air Force phase of its adverse weather testing program and has been turned over to the Army for cold weather user tests.

The helicopter has drawn favorable reports after testing in temperatures ranging from 65° below zero to 125° above.

Last year it was flown to Eglin Air Force Base, Fla., for more than six weeks of climatic hangar testing.

Later it was flown to Wright-Patterson AFB for more adverse weather testing, to the factory for installation of rotor blade and windshield ice-protection systems and equipping with a ski kit to permit landings in heavy snow and on marshy ground; then back to Wright-Patterson for de-icing tests; and finally airlifted to Nielson AFB, Alaska, for more Air Force weather tests.